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Vol. 1128 Number 5

# OFFICIAL GAZETTE

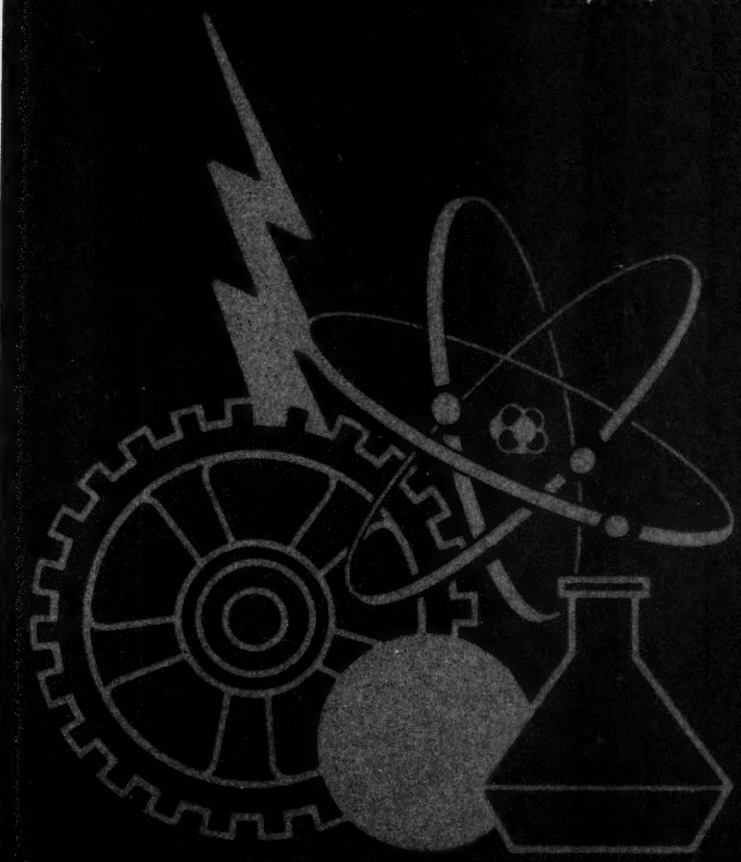
of the

## UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

July 30, 1991



U.S.
DEPARTMENT
OF COMMERCE

Patent
and
Trademark
Office

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# OFFICIAL GAZETTE of the
# UNITED STATES PATENT AND TRADEMARK OFFICE

July 30, 1991 Volume 1128 Number 5


## CONTENTS


| | Page |
|---|---|
| Patent and Trademark Office Notices | |
| Patent Cooperation Treaty (PCT) Information | 1128 OG 62 |
| Notice of Maintenance Fees Payable | 1128 OG 62 |
| Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees | 1128 OG 63 |
| Notification opf Acceptance of Delayed Payment of Maintenance Fee | 1128 OG 66 |
| Reissue Applications Filed | 1128 OG 66 |
| Requests for Reexaminations Filed | 1128 OG 67 |
| Service by Publication | 1128 OG 67 |
| Errata | 1128 OG 67 |
| Service by Publication | 1128 OG 68 |
| Status of PTO Services | 1128 OG 69 |
| Patent Certificates of Correction | 1128 OG 70 |
| Special Boxes for Mail | 1128 OG 71 |
| Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries | 1128 OG 72 |
| Patent Examining Corps | 1128 OG 74 |
| Reexaminations | 2683 |
| Reissue Patents Granted ( 33,648 ) | 2687 |
| Plant Patents Granted ( 7,604 ) | 2691 |
| Patents Granted | |
| General and Mechanical ( 5,034,998 ) | 2693 |
| Chemical ( 5,035,719 ) | 2941 |
| Electrical ( 5,036,160 ) | 3061 |
| Design Patents Granted ( 318,554 ) | 3197 |
| Index of Patentees | PI 1 |
| Indices of Reissue, Reexamination, Design and Plant Patents | PI 64 |
| Classification of | |
| Patents (Including Reissues and Reexaminations) | PI 71 |
| Designs, and Plants Applications | PI 74 |
| Geographical Index of Residence of Inventors | |
| Patents (Including Reissues and Reexaminations) | PI 75 |
| Designs and Plant Applications | PI 77 |
| Change of Address Form and Subscription Order Form | PI 79 |



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# PATENT AND TRADEMARK OFFICE NOTICES

## Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1126 O.G. 2 on May 7, 1991.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988. There is no longer a limit on the number of such international applications accepted for international preliminary examination by the European Patent Office; see the notice appearing at 1116 O.G. 32, on July 17, 1990.

The search fee of the European Patent Office was changed on July 1, 1991 due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark, and was announced in the *Official Gazette* at 1126 O.G. 76 on May 28, 1991.

International PCT fees were changed on March 1, 1991 due to a difference in the exchange rate of the U.S. dollar in relation to the Swiss Franc and were announced in the *Official Gazette* at 1122 O.G. 629 on Jan. 22, 1991.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees ( in U.S. dollars) is as follows:

| | |
|---|---|
| Transmittal fee: | 170.00 |
| Search Fee | |
| U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA) | |
| —No corresponding prior U.S. national application filed | 550.00 |
| —Corresponding prior U.S. national application filed | 380.00 |
| —Supplemental search fee, per additional invention | 150.00 |
| European Patent Office as ISA | 1320.00 |
| Preliminary examination fee | |
| USPTO as International Preliminary Examining Authority (IPEA) | |
| —Search fee paid to USPTO as ISA | 400.00 |
| —Additional examination fee, per additional invention | 130.00 |
| —ISA not the USPTO | 600.00 |
| —Additional examination fee, per additional invention | 200.00 |
| International fees | |
| Basic fee | 559.00 |
| Basic Supplemental fee (for each page over 30) | 11.00 |
| Designation fee per country or region for the first 10 national or regional offices | 135.00 |
| Designation fee for 11th and subsequent designations | No Charge |
| Handling fee | 171.00 |

U.S. National Stage fees

| | Small Entity | Regular |
|---|---|---|
| USPTO was IPEA | 165.00 | 330.00 |
| USPTO was ISA but not IPEA | 185.00 | 370.00 |
| USPTO was neither ISA nor IPEA | 250.00 | 500.00 |
| USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4) | 25.00 | 50.00 |
| —For each independent claim in excess of 3 | 18.00 | 36.00 |
| —For each claim in excess of 20 | 6.00 | 12.00 |
| —For each application containing a multiple dependent claim | 60.00 | 120.00 |
| —Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1) | 60.00 | 120.00 |
| —Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1) | 30.00 | 30.00 |

May 2, 1991

HARRY F. MANBECK, Jr.
*Assistant Secretary and Commissioner of Patents and Trademarks.*

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## Status of Appeal Cases

**The Date of Examiner's Answer of Oldest Ex Parte Appeals Awaiting Assignment to Panel For A Decision Without a Hearing as of June 28, 1991.**

| | |
|---|---|
| Chemical Discipline - | May 1, 1990 |
| Mechanical Discipline - | August 2, 1990 |
| Electrical Discipline - | September 7, 1990 |

**The Date of Examiner's Answer of Oldest Ex Parte Appeals Awaiting the Setting of Hearing Date as of June 28, 1991.**

| | |
|---|---|
| Chemical - | September 1, 1988* |
| Electrical - | August 9, 1989* |
| Mechanical - | August 3, 1989* |

**Board of Patent Appeals and Interferences Decisions Rendered in Ex Parte Appeals During the Month of June 1991.**

| | |
|---|---|
| Affirmed | 203 |
| Affirmed-in-Part | 51 |
| Reversed | 98 |
| Total Decided | 352 |

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## Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month

*These cases were just recently received from the Examining group.

grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on July 26, 1988 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,759,082 through 4,760,609
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on July 24, 1984 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,461,043 through 4,462,114
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), and (f), as amended Nov. 5, 1990, which are reproduced below:

37 CFR § 1.20 Post-issuance fees and surcharges.

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant.....$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant.....$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)).....$415.00
By other than a small entity.....$830.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f)).....$835.00
By other than a small entity.....$1670.00"

The amounts of the surcharges for paying the maintenance fee during the grace period or after the expiration of the patent are set forth in 37 CFR 1.20(k), (l) and (m), which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27,1982.....$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f)).....$60.00
By other than a small entity.....$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....$550.00"

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**Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees**

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

*PATENTS WHICH EXPIRED MAY 19, 1991*
*DUE TO FAILURE TO PAY MAINTENANCE FEES*

| Patent Number | Serial Number | Issue Date |
|---|---|---|
| 4,383,346 | 06/271,823 | 5/17/83 |
| 4,383,354 | 06/256,718 | 5/17/83 |
| 4,383,358 | 06/317,806 | 5/17/83 |
| 4,383,362 | 06/241,225 | 5/17/83 |
| 4,383,373 | 06/309,478 | 5/17/83 |
| 4,383,375 | 06/240,852 | 5/17/83 |
| 4,383,378 | 06/239,265 | 5/17/83 |
| 4,383,386 | 06/232,331 | 5/17/83 |
| 4,383,387 | 06/267,093 | 5/17/83 |
| 4,383,390 | 06/300,784 | 5/17/83 |
| 4,383,396 | 06/298,876 | 5/17/83 |
| 4,383,410 | 06/237,483 | 5/17/83 |
| 4,383,421 | 06/281,852 | 5/17/83 |
| 4,383,429 | 06/241,581 | 5/17/83 |
| 4,383,432 | 06/262,402 | 5/17/83 |
| 4,383,437 | 06/236,716 | 5/17/83 |
| 4,383,442 | 06/226,543 | 5/17/83 |
| 4,383,451 | 06/252,846 | 5/17/83 |
| 4,383,463 | 06/231,795 | 5/17/83 |
| 4,383,465 | 06/305,483 | 5/17/83 |
| 4,383,469 | 06/286,283 | 5/17/83 |
| 4,383,478 | 06/287,885 | 5/17/83 |
| 4,383,487 | 06/273,395 | 5/17/83 |
| 4,383,492 | 06/227,657 | 5/17/83 |
| 4,383,494 | 06/236,006 | 5/17/83 |
| 4,383,495 | 06/390,579 | 5/17/83 |
| 4,383,496 | 06/360,469 | 5/17/83 |
| 4,383,502 | 06/228,220 | 5/17/83 |
| 4,383,505 | 06/269,597 | 5/17/83 |
| 4,383,507 | 06/251,486 | 5/17/83 |
| 4,383,509 | 06/319,888 | 5/17/83 |
| 4,383,510 | 06/240,691 | 5/17/83 |
| 4,383,512 | 06/258,573 | 5/17/83 |
| 4,383,530 | 06/270,871 | 5/17/83 |
| 4,383,531 | 06/339,768 | 5/17/83 |
| 4,383,533 | 06/233,270 | 5/17/83 |
| 4,383,536 | 06/324,832 | 5/17/83 |
| 4,383,545 | 06/249,030 | 5/17/83 |
| 4,383,556 | 06/233,200 | 5/17/83 |
| 4,383,571 | 06/244,253 | 5/17/83 |
| 4,383,582 | 06/254,445 | 5/17/83 |
| 4,383,593 | 06/258,403 | 5/17/83 |
| 4,383,602 | 06/260,107 | 5/17/83 |
| 4,383,606 | 06/218,119 | 5/17/83 |
| 4,383,610 | 06/237,851 | 5/17/83 |
| 4,383,611 | 06/340,114 | 5/17/83 |
| 4,383,618 | 06/348,545 | 5/17/83 |
| 4,383,624 | 06/339,511 | 5/17/83 |
| 4,383,632 | 06/230,830 | 5/17/83 |
| 4,383,636 | 06/271,395 | 5/17/83 |
| 4,383,637 | 06/289,367 | 5/17/83 |
| 4,383,648 | 06/325,971 | 5/17/83 |

| Patent Number | Serial Number | Issue Date |
|---|---|---|
| 4,383,655 | 06/251,725 | 5/17/83 |
| 4,383,657 | 06/244,781 | 5/17/83 |
| 4,383,659 | 06/239,498 | 5/17/83 |
| 4,383,671 | 06/280,031 | 5/17/83 |
| 4,383,672 | 06/359,059 | 5/17/83 |
| 4,383,673 | 06/220,149 | 5/17/83 |
| 4,383,678 | 06/307,187 | 5/17/83 |
| 4,383,690 | 06/284,177 | 5/17/83 |
| 4,383,694 | 06/242,009 | 5/17/83 |
| 4,383,707 | 06/233,646 | 5/17/83 |
| 4,383,711 | 06/226,949 | 5/17/83 |
| 4,383,713 | 06/223,345 | 5/17/83 |
| 4,383,715 | 06/238,167 | 5/17/83 |
| 4,383,732 | 06/264,336 | 5/17/83 |
| 4,383,748 | 06/328,382 | 5/17/83 |
| 4,383,760 | 06/226,754 | 5/17/83 |
| 4,383,784 | 06/312,263 | 5/17/83 |
| 4,383,801 | 06/239,218 | 5/17/83 |
| 4,383,809 | 06/240,643 | 5/17/83 |
| 4,383,814 | 06/341,165 | 5/17/83 |
| 4,383,818 | 06/221,796 | 5/17/83 |
| 4,383,828 | 06/287,270 | 5/17/83 |
| 4,383,829 | 06/359,295 | 5/17/83 |
| 4,383,845 | 06/339,758 | 5/17/83 |
| 4,383,855 | 06/249,798 | 5/17/83 |
| 4,383,857 | 06/280,572 | 5/17/83 |
| 4,383,859 | 06/264,760 | 5/17/83 |
| 4,383,861 | 06/342,312 | 5/17/83 |
| 4,383,867 | 06/279,137 | 5/17/83 |
| 4,383,872 | 06/216,339 | 5/17/83 |
| 4,383,879 | 06/245,709 | 5/17/83 |
| 4,383,881 | 06/303,042 | 5/17/83 |
| 4,383,900 | 06/252,576 | 5/17/83 |
| 4,383,907 | 06/285,523 | 5/17/83 |
| 4,383,915 | 06/339,617 | 5/17/83 |
| 4,383,923 | 06/278,624 | 5/17/83 |
| 4,383,928 | 06/346,958 | 5/17/83 |
| 4,383,931 | 06/326,698 | 5/17/83 |
| 4,383,935 | 06/319,274 | 5/17/83 |
| 4,383,951 | 06/295,846 | 5/17/83 |
| 4,383,952 | 06/337,421 | 5/17/83 |
| 4,383,967 | 06/394,256 | 5/17/83 |
| 4,383,968 | 06/276,252 | 5/17/83 |
| 4,383,989 | 06/317,312 | 5/17/83 |
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| 4,383,999 | 06/372,504 | 5/17/83 |
| 4,384,003 | 06/278,040 | 5/17/83 |
| 4,384,016 | 06/290,554 | 5/17/83 |
| 4,384,024 | 06/265,220 | 5/17/83 |
| 4,384,036 | 06/300,098 | 5/17/83 |
| 4,384,037 | 06/239,339 | 5/17/83 |
| 4,384,038 | 06/319,774 | 5/17/83 |
| 4,384,039 | 06/355,607 | 5/17/83 |
| 4,384,041 | 06/251,784 | 5/17/83 |
| 4,384,053 | 06/225,533 | 5/17/83 |
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| 4,384,065 | 06/386,746 | 5/17/83 |
| 4,384,070 | 06/279,725 | 5/17/83 |
| 4,384,071 | 06/286,695 | 5/17/83 |
| 4,384,079 | 06/310,585 | 5/17/83 |
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| 4,384,084 | 06/347,402 | 5/17/83 |
| 4,384,090 | 06/288,886 | 5/17/83 |
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| 4,384,093 | 06/254,499 | 5/17/83 |
| 4,384,102 | 06/336,659 | 5/17/83 |
| 4,384,110 | 06/358,406 | 5/17/83 |
| 4,384,112 | 06/305,932 | 5/17/83 |
| 4,384,119 | 06/340,671 | 5/17/83 |
| 4,384,125 | 06/271,933 | 5/17/83 |
| 4,384,127 | 06/251,844 | 5/17/83 |
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| 4,384,145 | 06/276,841 | 5/17/83 |
| 4,384,152 | 06/218,000 | 5/17/83 |
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| 4,384,168 | 06/262,832 | 5/17/83 |
| 4,384,181 | 06/277,124 | 5/17/83 |
| 4,384,183 | 06/251,196 | 5/17/83 |
| 4,384,187 | 06/252,534 | 5/17/83 |
| 4,384,188 | 06/252,564 | 5/17/83 |
| 4,384,203 | 06/264,271 | 5/17/83 |
| 4,384,214 | 06/289,827 | 5/17/83 |
| 4,384,220 | 06/229,746 | 5/17/83 |
| 4,384,221 | 06/245,264 | 5/17/83 |
| 4,384,223 | 06/254,257 | 5/17/83 |
| 4,384,239 | 06/336,696 | 5/17/83 |
| 4,384,257 | 06/268,358 | 5/17/83 |
| 4,384,259 | 06/237,982 | 5/17/83 |
| 4,384,268 | 06/233,070 | 5/17/83 |
| 4,384,282 | 06/246,300 | 5/17/83 |
| 4,384,289 | 06/227,809 | 5/17/83 |
| 4,384,309 | 06/248,992 | 5/17/83 |
| 4,384,313 | 06/233,773 | 5/17/83 |
| 4,384,315 | 06/293,986 | 5/17/83 |
| 4,384,318 | 06/219,789 | 5/17/83 |
| 4,384,319 | 06/217,627 | 5/17/83 |
| 4,384,329 | 06/218,222 | 5/17/83 |
| 4,384,333 | 06/279,041 | 5/17/83 |
| 4,384,338 | 06/219,643 | 5/17/83 |
| 4,665,563 | 06/728,331 | 5/19/87 |
| 4,665,565 | 06/853,145 | 5/19/87 |
| 4,665,569 | 06/798,633 | 5/19/87 |
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| 4,665,583 | 06/846,844 | 5/19/87 |
| 4,665,602 | 06/820,973 | 5/19/87 |
| 4,665,620 | 06/760,761 | 5/19/87 |
| 4,665,622 | 06/798,998 | 5/19/87 |
| 4,665,625 | 06/802,454 | 5/19/87 |
| 4,665,637 | 06/759,406 | 5/19/87 |
| 4,665,638 | 06/833,167 | 5/19/87 |
| 4,665,642 | 06/648,305 | 5/19/87 |
| 4,665,643 | 06/832,059 | 5/19/87 |
| 4,665,647 | 06/777,698 | 5/19/87 |
| 4,665,649 | 06/731,064 | 5/19/87 |
| 4,665,659 | 06/864,446 | 5/19/87 |
| 4,665,663 | 06/879,193 | 5/19/87 |
| 4,665,668 | 06/835,618 | 5/19/87 |
| 4,665,669 | 06/912,792 | 5/19/87 |
| 4,665,671 | 06/845,888 | 5/19/87 |
| 4,665,676 | 06/813,781 | 5/19/87 |
| 4,665,683 | 06/859,024 | 5/19/87 |
| 4,665,686 | 06/787,648 | 5/19/87 |
| 4,665,697 | 06/634,579 | 5/19/87 |
| 4,665,700 | 06/852,071 | 5/19/87 |
| 4,665,704 | 06/774,313 | 5/19/87 |
| 4,665,707 | 06/769,510 | 5/19/87 |
| 4,665,710 | 06/778,449 | 5/19/87 |
| 4,665,714 | 06/743,908 | 5/19/87 |
| 4,665,735 | 06/804,050 | 5/19/87 |
| 4,665,742 | 06/763,358 | 5/19/87 |
| 4,665,743 | 06/810,706 | 5/19/87 |
| 4,665,750 | 06/809,697 | 5/19/87 |
| 4,665,752 | 06/749,566 | 5/19/87 |
| 4,665,755 | 06/809,429 | 5/19/87 |
| 4,665,767 | 06/835,429 | 5/19/87 |
| 4,665,768 | 06/876,744 | 5/19/87 |
| 4,665,778 | 06/846,000 | 5/19/87 |
| 4,665,790 | 06/785,741 | 5/19/87 |
| 4,665,796 | 06/646,616 | 5/19/87 |
| 4,665,799 | 06/790,444 | 5/19/87 |
| 4,665,805 | 06/691,560 | 5/19/87 |
| 4,665,813 | 06/826,574 | 5/19/87 |
| 4,665,814 | 06/874,090 | 5/19/87 |
| 4,665,820 | 06/834,770 | 5/19/87 |
| 4,665,825 | 06/842,170 | 5/19/87 |
| 4,665,826 | 06/747,049 | 5/19/87 |
| 4,665,827 | 06/813,251 | 5/19/87 |
| 4,665,828 | 06/674,170 | 5/19/87 |
| 4,665,833 | 06/301,232 | 5/19/87 |
| 4,665,838 | 06/780,183 | 5/19/87 |
| 4,665,841 | 06/864,004 | 5/19/87 |
| 4,665,849 | 06/808,513 | 5/19/87 |
| 4,665,852 | 06/795,359 | 5/19/87 |
| 4,665,854 | 06/713,403 | 5/19/87 |

| Patent Number | Serial Number | Issue Date |
|---|---|---|
| 4,665,855 | 06/749,305 | 5/19/87 |
| 4,665,856 | 06/783,454 | 5/19/87 |
| 4,665,861 | 06/674,513 | 5/19/87 |
| 4,665,862 | 06/813,913 | 5/19/87 |
| 4,665,863 | 06/819,685 | 5/19/87 |
| 4,665,869 | 06/782,438 | 5/19/87 |
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## NOTIFICATION OF ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEE (35 U.S.C. 41(c); 37 CFR 1.378)

The patent(s) listed below are considered as not having expired but are subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

| Patent No. | Serial No. | Patent Date | Application Filing Date | Delayed Payment Acceptance Date |
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| 4,583,207 | 06/444,988 | 4/15/86 | 11/29/82 | 5/15/91 |
| 4,589,504 | 06/634,956 | 5/20/86 | 7/27/84 | 5/15/91 |
| 4,622,382 | 06/753,194 | 11/11/86 | 7/09/85 | 5/30/91 |

### Reissue Applications Filed

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b).

**4,705,038**, Re. S. N. 07/714,334, Filed June 12, 1991, Cl. 128,, SURGICAL SYSTEM FOR POWERED INSTRUMENTS, Douglas Sjostrom, Owner of Record: *Smith and Nephew Dyonics, Inc., Andover, Mass.*, Attorney or Agent: Peter J. Devlin, Ex. Gp.: 336

**4,791,123**, Re. S. N. 07/720,091, Filed June 20, 1991, Cl. 514/345, INSECTICIDAL TRIFFLUORMETHYL ALKANE DERIVATIVES, Helga Franke, et al., Owner of Record: *Schering Aktiengesellschaft, Mullerstr, Germany*, Attorney or Agent: Edward A. Meilman. Ex. Gp.: 125

**4,809,972**, Re. S. N. 07/697,949, Filed May 5, 1991, Cl. 272/118, EXERCISE MACHINE WITH MULTIPLE EXERCISE STATIONS, Arthur B. Ish, et al., Owner of Record: *Vectra Fitness, Inc., Redmond, Wash.*, Attorney or Agent: Richard W. Seed, Ex. Gp.: 332

**4,817,012**, Re. S. N. 07/676,833, Filed Mar. 28, 1991, Cl. 364/488, METHOD FOR IDENTIFICATION OF PARASITIC TRANSISTOR DEVICES IN AN INTEGRATED STRUCTURE, Roberta Cali, Owner of Record: *SGS-Thomson Microelettronica, S.P.A., Agrate, Italy*, Attorney or Agent: Gregory M. Howison, Ex. Gp.: 234

**4,831,739**, Re. S. N. 07/697,099, Filed May 8, 1991, Cl. 33/427, ADJUSTABLE TEMPLATE DEVICE FOR FRAMING AND CUTTING SHEET MATERIALS, James A. Davidson, Owner of Record: *Inventor*, Attorney or Agent: Alan Norman, Ex. Gp.: 246

**4,890,871**, Re. S. N. 07/686,513, Filed April 17, 1991, Cl. 292/337, TUBULAR DOOR LOCK WITH AN ADJUSTABLE DEVICE FOR SETTING THE DEAD BOLT, Jui C. Lin, Owner of Record: *Inventor*, Attorney or Agent: Marvin R. Stern, Ex. Gp.: 358

**4,927,622**, Re. S. N. 07/717,539, Filed June 19, 1991, Cl. 423/608, PROCESS FOR PRODUCING ZIRCONIUM BASED GRANULES, Sivananda S. Jade, Owner of Record: *Manville Corp., Denver, Colo.*, Attorney or Agent: William J. Schramm, Ex. Gp.: 113

**4,955,510**, Re. S. N. 07/649,641, Filed May 2, 1991, Cl. 222/305, BEAN AND GROUND COFFEE CARRIER FOR USE IN COFFEE SYSTEMS, Brian D. Newman, Owner of Record:

*Grindmaster Corp., Louisville, Ky.*, Attorney or Agent: Vance A. Smith, Ex. Gp.: 314

**4,969,681**, Re. S. N. 07/718,213, Filed June 20, 1991, Cl. 296/223, FRAME ARRANGEMENT FOR A VEHICLE ROOF, Bernd Schleicher, et al., Owner of Record: *Webasto AG Fahrzeugtechnik, Stockford, Fed, Rep. of Germany*, Attorney or Agent: David S. Safran, Ex. Gp.: 312

**4,987,521**, Re. S. N. 07/719,338, Filed June 21, 1991, Cl. 362/61, A MOTOR VEHICLE HEADLIGHT INCLUDING A SINGLE LIGHT SOURCE FOR GENERATING TWO DIFFERENT BEAMS, Hector Fratty, et al., Owner of Record: *Valeo Vision, 93012 Bubigny Cedex, France*, Attorney or Agent: John C. Hilton, Ex. Gp.: 346

## Requests for Reexamination Filed

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

**3,805,611**, Reexam. No. 90/002,374, Requested June 24, 1991, Cl. 073/861.58, FLUID FLOW METER, Harry A. Hedland, Owner of Record: *Racine Federated, Inc., Racine, Wisc.*, Attorney or Agent: Arthur J. Hansmann, Racine, Wisc., Ex. Gp.: 267, Requester: Lake Monitors, Inc., Racine, Wisc.

**4,263,650** Reexam. No. 90/002,364, Requested June 17, 1991, Cl. 364/200, DIGITAL PROCESSING SYSTEM WITH INTERFACE ADAPTOR HAVING PROGRAMMABLE MONITORABLE CONTROL REGISTER THEREIN, Thomas H. Bennett, et al., Owner of Record: *Motorola, Inc., Schaumberg, Ill.*, Attorney or Agent: Vincent J. Rauner, Schaumberg, Ill., Ex. Gp.: 232, Requester: Owner

**4,376,286**, Reexam. No. 90/002,371, Requested June 18, 1991, Cl. 357/023.4, HIGH POWER MOSFET WITH LOW ON-RESISTANCE AND HIGH BREAKDOWN VOLTAGE, Alexander Lidow, et al., Owner of Record: *International Rectifier Corp., Los Angeles, Calif.*, Attorney or Agent: Samuel H. Weiner, Ostrolenk, Faber, Gerb & Sofen, New York, N. Y., Ex. Gp.: 258, Requester: Harris Corp., Melborne, Fla.

**4,410,892**, Reexam. No. 90/002,378, Requested June 25, 1991, Cl. 343/786, REFLECTOR-TYPE MICROWAVE ANTENNAS WITH ABSORBER LINED CONICAL FEED, Charles M. Knop, et al., Owner of Record: *Andrew Corp., Orland Park, Ill.*, Attorney or Agent: Leydig, Voit, Osann, Mayer & Holt, Ltd., Chicago, Ill., Ex. Gp.: 258, Requester: Gabriel Electronics, Inc., Scarborough, Me.

**4,576,384**, Reexam. No. 90/002,380, Requested June 27, 1991, Cl. 277/081F, SPLIT MECHANICAL FACE SEAL, Henri V. Azibert, Owner of Record: *A. W. Chesterson Co., Stoneham, Mass.*, Attorney or Agent: James E. Maslow, Lahive & Cockfield, Boston, Mass., Ex. Gp.: 246, Requester: Owner

**4,600,919**, Reexam. No. 90/002,379, Requested June 26, 1991, Cl. 340/725, THREE DIMENSIONAL ANIMATION, Garland Stern, Owner of Record: *New York Institute of Technology, Old Westbury, N. Y.*, Attorney or Agent: Martin Novack, Westport, Conn., Ex. Gp.: 269, Requester: Anonymous, C/O Fisher, Christen & Sabol, Washington, D. C.

**4,741,711**, Reexam. No. 90/002,373, Requested June 21, 1991, Cl. 439/620, MOSULAR DISTRIBUTION FRAME INCLUDING PROTECTOR MOSULES ADAPTED FOR BREAK ACCESS TESTING, Loren A. Singer, Jr., Owner of Record: *ADC Telecommunications, Inc., Minneapolis, Minn.*, Attorney or Agent: Merchant, Gould, Smith, Edell, et al., Minneapolis, Minn., Ex. Gp.: 322, Requester: Krone AG, Berlin, Germany

**4,847,588**, Reexam. No. 90/002,372, Requested July 30, 1991, Cl. 439/751, ELECTRICAL CONNECTOR WITH PIN RETENTION FEATURE, Ray C. Doutrich, Owner of Record: *E. I. DuPont DeNemours & Co., Wilmington, Del.*, Attorney or Agent: Barry Estrin, Patricia M. Scott, Wilmington, Del., Ex. Gp.: 322, Requester: Thomas & Betts Corp., Bridgewater, N.J.

**4,937,254**, Reexam. No. 90/002,377, Requested June 25, 1991, Cl. 514/420, METHOD FOR INHIBITION POST-SURGICAL ADHESION FORMATION BY THE TOPICAL ADMINISTRATION OF NON-STEROIDAL ANTI-INFLAMMATORY DRUG, Warren D. Sheffield, et al., Owner of Record: *Ethicon, Inc., Somerville, N.J.*, Attorney or Agent: Robert L. Minier, New Brunswick, N.J., Ex. Gp.: 125, Requester: Leonard R. Svensson, Birch, Stewart, Kolasch & Birch, Falls Church, Va.

**4,966,324**, Reexam. No. 90/002,381, Requested June 28, 1991, Cl. 229/117.13, INTEGRAL CARRYING HANDLE FOR A CAN CARTON AND CARTON BLANK CONTAINING SAME, Thomas C. Steel, Owner of Record: *Inventor, Malverne, N.Y.*, Attorney or Agent: Collard, Roe & Galgano, Roslyn, N. Y., Ex. Gp.: 241, Requester: William H. Needle, Needle & Rosenberg, Atlanta, Ga.

**5,023,931**, Reexam. No. 90/002,375, Requested June 24, 1991, Cl. 455/021.0, TELEVISION LOCAL WIRELESS TRANSMISSION AND CONTROL, Donald A. Streck, et al., Owner of Record: *Donald A. Streck, Ojai, Calif. & Jerry R. Iggulden, Newhall, Calif.*, Attorney or Agent: Donald A. Streck, Ventura, Calif., Ex. Gp.: 267, Requester: Gemini Industries, Inc,. Clifton, N. J.

## Service by Publication

A petition to cancel each of the registrations identified below having been filed, and the notice of such proceeding sent by certified mail to registrants at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrants listed herein, their assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Cypher Master, Inc., Long Beach, Calif., Reg. No. 1,369,980, for the mark "CYPHERMASTER", Canc. No. 19,372.

The Trojan Luggage Co., Memphis, Tenn., Reg. No. 1,365,603 for the mark "DANTE", Canc. No. 19,595

JEAN BROWN
*Administrator, Trademark*
*Trial and Appeal Board*
For JEFFREY M. SAMUELS
*Assistant Commissioner*
*for Trademarks*

## Errata

All reference to Patent No. 5,020,875 to Candido J. Arroyo of Georgia for 'COMMUNICATIONS CABLE HAVING MICROBIAL RESISTANT WATER BLOCKING PROVISIONS' appearing in the Official Gazette of June 4, 1991 should be deleted since no patent was granted."

"All reference to Patent No. 5,022,998 to Johnny Arnaud of Texas for `METHOD FOR TREATING FLUIDS', appearing in the Official Gazette of June 11, 1991 should be deleted since no patent was granted."

**Service by Publication**

A petition to cancel the registration identified below having been filed, and the notice of such proceeding sent by registered mail to registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrant listed herein, its assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Mainstreet Retail Stores Inc., Bannockburn, Ill., Registration No. 1,444,731 for the mark "MAINSTREET", Canc. No. 19,061.

JEAN BROWN
*Administrator, Trademark*
*Trial and Appeal Board*
For JEFFREY M. SAMUELS
*Assistant Commissioner*
*for Trademarks*

## Status of PTO Services

The following is an update of the status of PTO services for June 1991:

| Service Item | FY 1991 Goal (Calendar Days )* | Monthly Average (Calendar Days )* |
|---|---|---|
| Filing Receipts: | | |
| Patents | 22 | 17 |
| Trademarks | 30 | 37 |
| Patent/Trademark Copies: | | |
| Special Window Coupons | 24 Hours | 14 Hours |
| Window Coupons | 5 | 2 |
| Mail Coupons | 12 | 7 |
| Letter Orders | 16 | 14 |
| Electronic Ordering Service (EOS) | 11 | 6 |
| Certified Copies: | | |
| Trademark Registrations | 21 | 7 |
| Applications-As-Filed | 17 | 16 |
| File-Wrapper/Contents | N/A | 28 |
| Walk-up Certification | 1 | 1 |
| Patent Application Expedited | 5 | 10 |
| Trademark Search Library: | | |
| Filing Pending Marks | 23 | 33 |
| Filing Reg. Certificates | Issue Date+2 days | On Goal |
| Filing Temp. Drawings | 8 | 11 |
| Assignments: | | |
| Recording Patent-New Applications | 20** | 24 |
| Recording Patent-Mail Room Recpts. | 20 | 21 |
| Return Patents-New Applications | 34** | 39 |
| Return Patents-Mail Room Recpts. | 34 | 38 |
| Recording Trademarks | 20 | 15 |
| Returning Trademark Documents | 34 | 29 |
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July 5, 1991

THERESA BRELSFORD
*Assistant Commissioner for Administration*

# PATENT NOTICES

## Certificates of Correction For Week of July 30, 1991

| | | | |
|---|---|---|---|
| Re. 33,155 | 4,876,663 | 4,903,570 | 4,918,065 |
| D. 306,105 | 4,877,185 | 4,904,730 | 4,918,173 |
| 4,685,467 | 4,877,680 | 4,905,512 | 4,918,633 |
| 4,712,393 | 4,878,982 | 4,905,999 | 4,919,139 |
| 4,738,705 | 4,879,390 | 4,906,288 | 4,919,338 |
| 4,777,361 | 4,880,940 | 4,906,500 | 4,919,642 |
| 4,781,759 | 4,881,933 | 4,908,013 | 4,920,147 |
| 4,784,892 | 4,882,400 | 4,908,042 | 4,920,438 |
| 4,786,510 | 4,883,017 | 4,908,278 | 4,920,591 |
| 4,792,453 | 4,884,147 | 4,908,439 | 4,920,870 |
| 4,796,668 | 4,887,585 | 4,908,793 | 4,921,982 |
| 4,806,245 | 4,888,039 | 4,908,886 | 4,922,410 |
| 4,810,254 | 4,888,211 | 4,909,152 | 4,922,630 |
| 4,812,238 | 4,888,213 | 4,909,184 | 4,923,217 |
| 4,812,977 | 4,888,242 | 4,909,434 | 4,923,740 |
| 4,814,357 | 4,888,436 | 4,909,509 | 4,925,123 |
| 4,816,990 | 4,889,596 | 4,909,901 | 4,925,134 |
| 4,817,270 | 4,890,962 | 4,909,955 | 4,926,076 |
| 4,823,998 | 4,891,200 | 4,910,180 | 4,926,476 |
| 4,824,443 | 4,891,482 | 4,911,106 | 4,926,931 |
| 4,827,169 | 4,891,997 | 4,911,147 | 4,927,294 |
| 4,829,676 | 4,893,370 | 4,911,409 | 4,927,549 |
| 4,832,250 | 4,893,927 | 4,911,414 | 4,927,643 |
| 4,833,536 | 4,894,658 | 4,912,089 | 4,927,662 |
| 4,837,150 | 4,894,846 | 4,912,499 | 4,927,679 |
| 4,838,899 | 4,895,762 | 4,912,876 | 4,927,789 |
| 4,842,783 | 4,895,802 | 4,913,217 | 4,928,196 |
| 4,845,118 | 4,896,108 | 4,913,306 | 4,928,206 |
| 4,847,587 | 4,896,964 | 4,913,340 | 4,928,843 |
| 4,850,159 | 4,897,022 | 4,913,733 | 4,929,704 |
| 4,850,948 | 4,897,173 | 4,913,763 | 4,929,765 |
| 4,854,259 | 4,897,665 | 4,913,968 | 4,929,925 |
| 4,861,660 | 4,897,730 | 4,914,142 | 4,930,083 |
| 4,862,548 | 4,897,734 | 4,914,407 | 4,935,231 |
| 4,865,476 | 4,898,625 | 4,915,000 | 4,939,371 |
| 4,866,716 | 4,899,788 | 4,915,614 | 4,940,214 |
| 4,868,307 | 4,901,092 | 4,915,656 | 4,940,642 |
| 4,872,044 | 4,901,279 | 4,916,603 | 4,949,063 |
| 4,875,343 | 4,901,385 | 4,916,921 | 4,964,686 |
| 4,875,517 | 4,901,534 | 4,917,283 | 4,973,879 |
| 4,875,855 | 4,902,101 | 4,917,298 | 5,005,824 |
| 4,876,025 | 4,903,145 | 4,917,301 | |
| 4,876,287 | 4,903,335 | 4,917,317 | |

## Disclaimers

4,282,425—*George E. Chadima, Jr.*, Cedar Rapids, Iowa; *Vadim Laser*, Cincinnati, Ohio. INSTANT PORTABLE BAR CODE READER. Patent dated Aug. 4, 1981. Disclaimer filed Apr. 18, 1991, by the assignee, Norand Corp.

The term of this patent subsequent to Aug. 4, 2008, has been disclaimed.

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4,817,798—*Harrison Huang*, Shenkang, Taiwan. CASSETTE TAPE HOLDING BOX AND DISPENSER. Patent dated Apr. 4, 1989. Disclaimer filed Apr. 8, 1991, by the assignee, Sunclipse, Inc.

Hereby enters this disclaimer to claims 1, 2, 3, 4, and 5, of said patent.

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4,837,513—*Ching Yao*, Belmont, Calif. MRI USING ASYMMETRIC RF NUTATION PULSES AND ASYMMETRIC SYNTHESIS OF COMPLEX CONJUGATED SE DATA TO REDUCE TE AND T2 DECAY NMR SPIN ECHO RESPONSES. Patent dated June 6, 1989. Disclaimer filed Apr. 10, 1991, by the assignee, The Regents of the University of California.

Hereby enters this disclaimer to claims 5 and 12 of said patent.

---

4,909,756—*James E. Jervis*, Atherton, Calif. SPLICE CASE. Patent dated Mar. 20, 1990. Disclaimer filed Aug. 21, 1989, by the assignee, Raychem Corp.

The term of this patent subsequent to Sept. 9, 2003 has been disclaimed.

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4,932,103—*Galen J. Klusmire*, Carmel, Calif. BRAKE-SIZING DEVICES FOR FOOD STUFFING APPARATUS AND METHODS OF USE. Patent dated June 12, 1990. Disclaimer filed Apr. 22, 1991, by the assignee, Teepak, Inc.

Hereby enters this disclaimer to claim 21 of said patent.

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**Expiration of patents**: The patents within the range of numbers indicated below expire during June 1991 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,813,694 to 3,821,816 inclusive
Plant Patents ..... 3,561 to 3,580 inclusive

# REEXAMINATIONS

## JULY 30, 1991

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

**B1 4,483,737 (1518th)**

**METHOD AND APPARATUS FOR PLASMA ETCHING A SUBSTRATE**

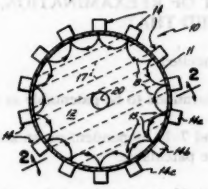
**Thomas D. Mantei, Cincinnati, Ohio, assignor to Sematech, Inc.**

**Reexamination Request No. 90/002,137, Sep. 14, 1990.**

**Reexamination Certificate for Patent No. 4,483,737, issued Nov. 20, 1984, Ser. No. 462,200, Jan. 31, 1983.**

**Int. Cl.**[5] **H01L** *21/306;* **B44C** *1/22;* **C03C** *15/00, 25/06*

**U.S. Cl. 156—643**



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–22** and **25–35** is confirmed.

Claim **23** is determined to be patentable as amended.

Claim **24**, dependent on an amended claim, is determined to be patentable.

**27**. The method of plasma etching of a semi-conductor substrate comprising the steps of:

placing a masked semiconductor substrate in a chamber,

admitting a gas into said chamber at low pressure,

producing a multipole surface magnetic field boundary within said chamber,

producing an ionizing discharge within said boundary and thereby ionizing said gas to produce a plasma,

confining said plasma within said magnetic boundary to provide a uniform plasma environment around said semiconductor substrate, and

etching said semiconductor substrate.

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**B1 4,492,276 (1519th)**

**DOWN-HOLE DRILLING MOTOR AND METHOD FOR DIRECTIONAL DRILLING OF BOREHOLES**

**Anthony W. Kamp, Rijswijk, Netherlands, assignor to Shell Oil Company**

**Reexamination Request No. 90/001,937, Feb. 12, 1990.**

**Reexamination Certificate for Patent No. 4,492,276, issued Jan. 8, 1985, Ser. No. 541,821, Oct. 13, 1983.**

**Claims priority, application United Kingdom, Nov. 17, 1982, 8232755**

**Int. Cl.**[5] **E21B** *7/04*

**U.S. Cl. 175—61**

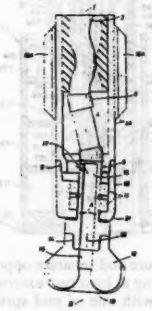
AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–7** is confirmed.

Claim **8** is determined to be patentable as amended.

New claims **9–11** are added and determined to be patentable.

**8**. Method for directional drilling a borehole with a downhole drilling apparatus having a housing with a motor therein which drives an output shaft mounted in a bearing in the bottom of said housing in a manner such that the axis of the output shaft is inclined to the axis of the housing comprising the steps of (a) connecting a drill bit inclined to the axis of the housing to the output shaft of the motor and connecting the motor to the lower end of a drill string, and subsequently lowering the drill string, motor and bit in a borehole, (b) continuously actu-



ating the motor and applying weight on bit during the drilling operation, and (c) steering the drilling apparatus within an earth formation simultaneously with step (b) by rotating the drill string over periods of straight hole drilling that are preceded and succeeded by selected periods of curved hole drilling in which the drill string is not rotated while maintaining the axis of rotation of the bit [and] *at* an angle to the axis of rotation of the housing at all times.

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**B1 4,741,711 (1520th)**

**MODULAR DISTRIBUTION FRAME INCLUDING PROTECTOR MODULES ADAPTED FOR BREAK ACCESS TESTING**

**Loren A. Singer, Jr., Minneapolis, Minn., assignor to ADC Telecommunications Inc.**

**Reexamination Request No. 90/002,239, Dec. 24, 1990.**

**Reexamination Certificate for Patent No. 4,741,711, issued May 3, 1988, Ser. No. 917,232, Oct. 6, 1986.**

**Continuation-in-part of Ser. No. 740,804, Jun. 3, 1985, abandoned**

**Int. Cl.**[5] **H01R** *13/06*

**U.S. Cl. 439—620**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

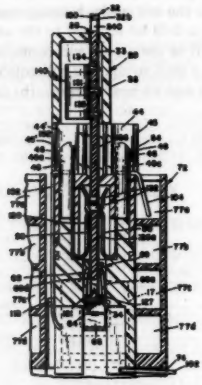
The patentability of claims **1–13** is confirmed.

**1**. A distribution frame module, comprising:

(a) a generally rectangular module block having a front face, said module including first and second parallel opposing rows of wire connectors supported therein and connector apertures in said front face through which individual wire connectors may be accessed for terminating wires, said module further including a row of protector apertures disposed between said first and second wire connector rows, said protector apertures for accepting overload protector elements;

(b) said wire connectors each having a wire terminating end and a spring contact finger end, the spring contact finger end of corresponding opposing connectors extending into one of said protector apertures, said finger ends of opposing connectors resiliently biased into making electrical connection between said opposing connectors; and

(c) a protector element having a first end sized to extend into



a protector aperture and separate opposing spring fingers, said element having at least two external contacts each for making contact with one of said spring fingers, and circuitry means carried on said element for connecting said external contacts in electrical connection when said protector element is disposed in a first position with said first end disposed between and separating said opposing spring fingers.

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**B1 4,790,429 (1521st)**
**PACKAGE**

**Tadao Fukushima, Kawasaki, Japan, assignor to Dispen Pak Japan Co., Inc., Tokyo, Japan**

**Reexamination Request No. 90/001,890, Nov. 20, 1989.**
**Reexamination Certificate for Patent No. 4,790,429, issued Dec. 13, 1988, Ser. No. 139,622, Dec. 30, 1987.**
**Claims priority, application Japan, Jan. 8, 1987, 62-627**
**Int. Cl.[5] B65D *25/08***
**U.S. Cl. 206—219**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1–3** are cancelled.

New claims **4, 5, 6** and **7** are added and determined to be patentable.

*4. A package comprising:*

*a lid made of a stiff material and having a bending line at the center of the surface thereof; and*

*a container member made of a flexible material, fixed to the reverse of said lid around its peripheral portion and forming a first pocket on one side of said bending line and a second pocket on the other side of said bending line;*

*each of said first and second pockets having a respective communication portion which communicates with a different portion on said bending line of said lid;*

*said communication portion of said first pocket not communicating with any portion of said second pocket and said communication portion of said second pocket not communicating with any portion of said first pocket, whereby said first and second pockets are isolated from each other;*

*said first and second pockets being both located on a common axis in the plane of said lid and said axis being normal to said bending line.*

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**B1 4,845,175 (1522nd)**
**PREPARATION OF AQUEOUS POLYMER EMULSIONS IN THE PRESENCE OF HYDROPHOBICALLY MODIFIED HYDROXYETHYLCELLULOSE**

**Chia-Chen Lo, Raleigh, N.C., assignor to Union Carbide Corporation, Danbury, Conn.**

**Reexamination Request No. 90/001,931, Feb. 1, 1990.**
**Reexamination Certificate for Patent No. 4,845,175, issued Jul. 4, 1989, Ser. No. 172,432, Mar. 24, 1988.**
**Int. Cl.[5] C08F *2/00, 2/30, 120/18***
**U.S. Cl. 526—200**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim **6** is cancelled.

Claim **1** is determined to be patentable as amended.

Claims **2–5** and **7–10**, dependent on an amended claim, are determined to be patentable.

New claims **11–20** are added and determined to be patentable.

**1.** In a process for the emulsion polymerization of ethylenically unsaturated monomers containing acrylic monomers in the presence of a polymerization catalyst, the improvement comprising:

*(i) adding a portion of the polymerization catalyst and a portion of the monomer after polymerization is commenced; and* (*ii*) conducting the emulsion polymerization in the presence of from about 0.02 to [about2.0] *about 2.0* percent by weight of the total monomer content, of a hydrophobically modified hydroxyethylcellulose, *whereby there is produced a stable emulsion with an average particle size below one micron.*

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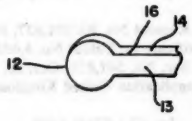
**B1 4,877,077 (1523rd)**
**VERTICAL COEXTRUDED PEARLESCENT LOUVER FOR VERTICAL BLINDS**

**George W. Ebert, Chatsworth, Calif., assignor to Home Fashions, Inc.**

**Reexamination Request No. 90/002,031, May 14, 1990.**
**Reexamination Certificate for Patent No. 4,877,077, issued Oct. 31, 1989, Ser. No. 193,806, May 13, 1988.**
**Int. Cl.[5] E06B *3/04*; B32B *5/16***
**U.S. Cl. 160—236**




AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1** and **13** are determined to be patentable as amended.

Claims **2–12** and **14—23**, dependent on an amended claim, are determined to be patentable.

New claims **24–35** are added and determined to be patentable.

1. A multilayer, *rigid* coextruded slat *for a window-covering blind* having *a length greatly exceeding its width, and further having* upper and lower surfaces, first and second side edges, and first and second ends; having an opaque base layer comprising a first thermoplastic polymer, and a thin transparent pearlescent layer comprising a second thermoplastic polymer upon at least one surface of said opaque base layer; and having a coextruded fusion interface between said opaque base layer and said transparent pearlescent layer.

upon a front the surface of said opaque base layer, and having a coextensive fusion interface between said opaque base layer and said transparent pellucent layer

14. A multilayer, heat-laminated tile floor-covering item having a finger groove extending in width, and further having upper and lower surfaces, first and second side edges, and first and second ends having an opaque base layer comprising a first thermoplastic polymer, and a thin transparent pellucent layer comprising a second thermoplastic polymer

# REISSUES

JULY 30, 1991

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

## Re. 33,648

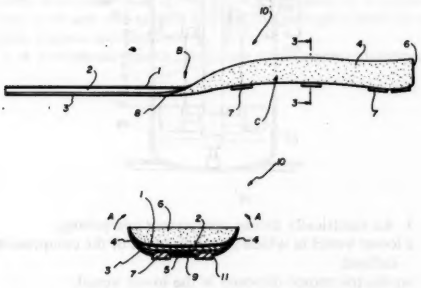
## VARIABLY ADJUSTABLE SHOE INSERTS

**Dennis N. Brown, Custer, Wash., assignor to Northwest Podiatric Laboratories, Inc., Blaine, Wash.**

**Original No. 4,510,700, dated Apr. 16, 1985, Ser. No. 431,291, Sep. 30, 1982. Application for reissue Apr. 15, 1987, Ser. No. 39,002**

**Int. Cl.[5] A43B** *13/38, 13/40*

**U.S. Cl. 36—44** **12 Claims**



*8. An orthotic insert having a lengthwise axis and adapted to be positioned in a boot, shoe or the like, comprising:*

*a. a blank made from a relatively resilient and yielding material, and having an upper surface shaped to conform to a plantar surface of a foot and a bottom surface, said blank having upwardly extending side portions to engage at least lower side portions of a rear portion of the foot;*

*b. a cap made of a relatively rigid material and positioned below said blank, said cap having upwardly extending side portions to be positioned adjacent to, and laterally outwardly of, the side portions of the blank;*

*c. said blank and said cap having interengaging means arranged to limit relative movement between said cap and said blank so as to maintain said cap and said blank in proper alignment; and*

*d. said blank having adjacent to its lower surface a lower recess extending along said lengthwise axis at least at a rear portion of the blank, with lower side portions of the rear portion of the blank engaging the cap, said recess being arranged in a manner that a downward force exerted by the rear of the foot centrally on the rear portion of the blank causes the side portions of the blank to move inwardly to grip the lower side portions of the rear portion of the foot in a manner to provide controlled support for the rear portion of the foot as weight is transferred from the rear portion of the foot and through a mid-foot portion of the foot.*

## Re. 33,649

## BUTTERFLY VALVE HAVING A FUNCTION FOR MEASURING A FLOW RATE AND METHOD OF MEASURING A FLOW RATE WITH A BUTTERFLY VALVE

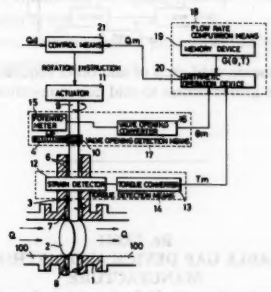
**Kouzi Kawai, Higashi-Osaka, Japan, assignor to Tomoe Technical Research Company, Japan**

**Original No. 4,926,903, dated May 22, 1990, Ser. No. 347,621, May 5, 1989. Application for reissue Oct. 9, 1990, Ser. No. 594,866**

**Claims priority, application Japan, Feb. 17, 1989, 1-38965**

**Int. Cl.[5] G01F** *1/28;* **F16K** *37/00*

**U.S. Cl. 137—554** **16 Claims**



**10.** A method of measuring a flow rate of a fluid flowing through a butterfly valve, comprising the steps of;

detecting a valve opening of said butterfly valve,

detecting a dynamic torque applied to a valve member of said butterfly valve around a valve shaft of said butterfly valve by said fluid, and

determining said flow rate as a function of said detected valve opening and said detected dynamic torque.

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## Re. 33,650

## DETERMINISTIC ACCESS PROTOCOL LOCAL AREA NETWORK

**P. I. P. Boulton, and E. S. Lee, both of Islington, Canada, assignors to University of Toronto Innovations Foundation, Toronto, Canada**

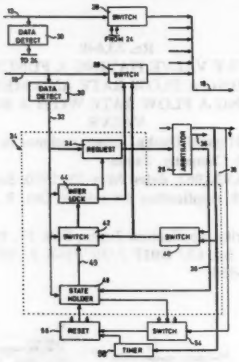
**Original No. 4,777,487, dated Oct. 11, 1988, Ser. No. 890,917, Jul. 30, 1986. Application for reissue Apr. 27, 1990, Ser. No. 515,639**

**Int. Cl.[5] H04Q** *9/00*

**U.S. Cl. 340—825.5** **7 Claims**

**1.** A data controller to control passage of data between a plurality of data handling devices comprising communication means to permit communication of said devices with one another, indicator means associated with each of said devices to indicate data is to be transmitted from any one of said devices, inhibit means operable upon a device after transmission of data thereby to inhibit access of that device to said communication means and said indicator means and reset means responsive to said indicator means *including a means to monitor each of said indicator means and provide a first signal to maintain said inhibit means when at least one of said indicator means indicates data is to be transmitted and a second signal* to remove said inhibit means when *each of the plurality of* said indicator means [indi-

cates] *indicate* that no data is to be transmitted, thereby preventing that device from gaining multiple access to said communication means until each of said other requesting handling devices have gained access to said communication means.

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**Re. 33,651**

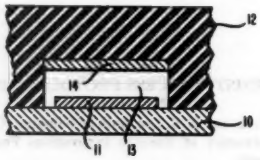
## VARIABLE GAP DEVICE AND METHOD OF MANUFACTURE

**Greg E. Blonder, Summit, N.J.; Angelo A. Lamola, Sudbury, Mass., and Robert A. Lieberman, Murray Hill, N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Original No. 4,617,608, dated Oct. 14, 1986, Ser. No. 744,382, Jun. 13, 1985. Continuation-in-part of Ser. No. 687,192, Dec. 28, 1984, abandoned. Application for reissue Oct. 11, 1988, Ser. No. 255,918**

**Int. Cl.[5] H01G** *5/18, 7/00;* **G01L** *9/00*

**U.S. Cl. 361—291** **24 Claims**




21. A variable capacitance device comprising:

a first body including a first electrode formed on one surface thereof;

a second body mounted over the first body, the said second body including a cavity formed therein which is positioned over said first electrode and which has a surface opposite the said electrode;

a second electrode formed on said surface of the cavity opposite the first electrode, at least one of said bodies being flexible so that the body can be deformed and the gap between the electrodes can be varied while the gap in the undeformed state is no greater than 30 μm;

each of said electrodes being u-shaped and surrounding a switch contact electrode electrically isolated therefrom;

*means for applying an attractive electrical potential to the first and second electrodes to narrow the gap sufficiently to cause the switch contact electrodes to come into electrical contact.*

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**Re. 33,652**

## ELECTRICALLY DRIVEN COMPRESSOR WITH A PERIPHERAL HOUSING WELD

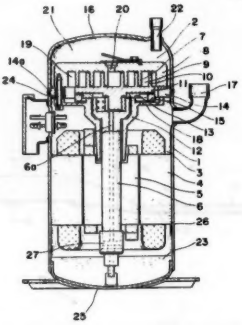
**Michio Yamamura; Kiyoshi Sawai, both of Kusatsu; Katuharu Fujio, Shiga; Shuuichi Yamamoto, Kyoto, and Hiroshi Morokoshi, Shiga, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Original No. 4,744,737, dated May 17, 1988, Ser. No. 56,410, May 29, 1987. Application for reissue Feb. 14, 1989, Ser. No. 312,197**

**Claims priority, application Japan, May 30, 1986, 61-126022**

**Int. Cl.[5] F04B** *39/12;* **F01C** *1/04*

**U.S. Cl. 418—55.1** **4 Claims**




1. An electrically driven compressor comprising:

a lower vessel in which a suction space of the compressor is defined;

an electric motor disposed in the lower vessel;

a compression mechanism for compressing gas introduced into the suction space of the compressor,

said compression mechanism comprising a stationary impeller component having a stationary impeller, a rotary impeller component having a rotary impeller for rotating relative to the stationary impeller, a plurality of spaces defined between said stationary impeller and said rotary impeller and communicating with said suction space, the gas entering into said plurality of spaces form said suction space so as to be compressed therein between the rotary impeller and the stationary impeller, a crank shaft operatively connected to said rotary impeller component and said electric motor for being driven by the electric motor to rotate said rotary impeller, a bearing component for rotatably supporting said crank shaft in the compressor, a self-rotation restricting means operatively connected to the rotary impeller component for preventing the rotary impeller from self-rotating when the gas enters said plurality of spaces and for only allowing a forced rotation thereof by said crank shaft, a thrust bearing operatively connected in a bearing relation with said rotary impeller component for supporting a thrust load exerted by said rotary impeller, a partition frame component interposed between said stationary impeller component and said bearing component;

an upper vessel encircling said stationary impeller component, and an upper space defined in said upper vessel, said upper space communicating with said plurality of spaces and in which the gas after being compressed in said plurality of spaces passes,

said partition frame component extending between said suction space and said upper space and between respective free ends said upper vessel and said lower vessel for separating said suction space from said upper space except via said plurality of spaces; and

a weld extending entirely along the outer periphery of said partition frame component for coupling the upper vessel

to the lower vessel and the partition frame component to said vessels and for effecting a seal between said suction space and said upper space at the portion of the compressor at which said partition frame component extends between the upper vessel and the lower vessel.

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Re. 33,653

## HUMAN RECOMBINANT INTERLEUKIN-2 MUTEINS

David F. Mark, Plainsboro, N.J.; Leo S. Lin, Walnut Creek, and Shi-da Y. Lu, Cupertino, both of Calif., assignors to Cetus Corporation, Emeryville, Calif.

Original No. 4,518,584, dated May 21, 1985, Ser. No. 564,224, Dec. 20, 1983. Continuation-in-part of Ser. No. 486,162, Apr. 15, 1983, abandoned, which is a continuation-in-part of Ser. No. 435,154, Oct. 19, 1982, abandoned. Application for reissue Jul. 26, 1989, Ser. No. 386,207

Int. Cl.[5] A61K *45/00, 37/02;* C07K *15/06;* C12P *21/06*

U.S. Cl. 424—85.1 10 Claims

1. Recombinant human interleukin-2 mutein, wherein the cysteine at position 125, numbered in accordance with native human interleukin-2, is [deleted or] replaced by a neutral amino acid and said mutein exhibits the biological activity of native, human interleukin-2.

7. A formulation for the diagnosis or therapeutic treatment (local or systemic) of bacterial, viral, parasitic, protozoan and fungal infections; for augmenting cell-mediated cytotoxicity; for stimulating lymphokine activated killer cell activity; for mediating recovery of immune function of lymphocytes; for augmenting alloantigen responsiveness; for facilitating recovery of immune function in acquired immune deficient states; for reconstitution of normal immunofunction in aged humans and animals; in the development of diagnostic assays such as those employing enzyme amplification, radiolabelling, radioimaging; for monitoring interleukin-2 levels in the diseased state; and for the promotion of T cell growth in vitro for therapeutic and diagnostic pruposes for blocking receptor sites for lymphokines; comprising:

(a) an effective amount of a recombinant human interleukin-2 mutein, wherein the cysteine residue at position 125, numbered in accordance with native human interleukin-2, is [deleted or] replaced by a neutral amino acid and said mutein exhibits the biological activity of native, human interleukin-2; and

(b) an inert, non-allergenic, pharmaceutically compatible carrier medium.

[illegible]

Original No. [illegible], dated May 17, 1983 [illegible] Dec. [illegible], 1982. Continuation-in-part of Ser. No. [illegible], [illegible] 1982, abandoned, which is a continuation-in-part of Ser. No. [illegible], abandoned. Application for reissue [illegible]

[illegible] Claims

[illegible]

# PLANT PATENTS

## GRANTED JULY 30, 1991

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,604

**MINIATURE ROSE PLANT/MINAXCO**

**Ernest D. Williams, 1510 Lebanon Ave., Dallas, Tex. 75208**

**Filed Apr. 26, 1990, Ser. No. 516,126**

**Int. Cl.[5] A01H** *5/00*

**U.S. Cl. Plt.—7** **1 Claim**

1. A new and distinct variety of miniature rose plant of hardy, dwarf, bushy, upright, much branched habit, substantially as illustrated and described, characterized by buds and flowers of soft lavender tan color, being of a shade generally near Greyed Orange 177 C and D on the outside surface and near Red-Purple 69 D to near Purple 76 D on inside surface, the bud and flower resembling the variety Amberglo (miniature not patented) in form and size but having a few more petals; and further characterized by a plant ofpg,7 vigorous and compact growth habit, easy to propagate from cuttings, with an abundance of flowers borne usually one to the stem.

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7,605

**MINIATURE ROSE PLANT/MINAYCO**

**Ernest D. Williams, 1510 Lebanon Ave., Dallas, Tex. 75208**

**Filed Apr. 30, 1990, Ser. No. 516,136**

**Int. Cl.[5] A01H** *5/00*

**U.S. Cl. Plt.—7** **1 Claim**

1. A new and distinct variety of miniature rose plant of hardy, dwarf, bushy, upright, much branched habit, substantially as illustrated and described, characterized by buds and flowers of a mauve blend color, being of a shade generally near Purple 76 D to near Purple 77 C, the bud and flower resembling the variety Amberglo (miniature—not patented) in form and size but having more petals; and further characterized by a plant of vigorous and compact growth habit, easy to propagate from cuttings, with an abundance of flowers borne usually one to the stem.

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7,606

**MINIATURE ROSE PLANT/MINAVCO**

**Ernest D. Williams, 1510 Lebanon Ave., Dallas, Tex. 75208**

**Filed Apr. 26, 1990, Ser. No. 516,713**

**Int. Cl.[5] A01H** *5/00*

**U.S. Cl. Plt.—7** **1 Claim**

1. A new and distinct variety of miniature rose plant of hardy, dwarf, bushy, upright, much branched habit, substantially as illustrated and described, characterized by buds and fragrant flowers of warm russet and yellow color, being of a shade generally near Greyed orange Group 172-B and Yellow Group 8-B, the bud and flower resembling the variety Amberglo (miniature not patented) in form and size but having fewer petals; and further characterized by a plant of vigorous and compact growth habit, easy to propagate from cuttings, with an abundance of flowers borne usually one to the stem.

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7,607

**MINIATURE ROSE PLANE/MINAZCO**

**Ernest D. Williams, 1510 Lebanon Ave., Dallas, Tex. 75208**

**Filed Apr. 27, 1990, Ser. No. 516,698**

**Int. Cl.[5] A01H** *5/00*

**U.S. Cl. Plt.—7** **1 Claim**

1. A new and distinct variety of miniature rose plant of hardy, dwarf, bushy, upright, much branched habit, substantially as illustrated and described, characterized by buds and flowers of soft russet color, being of a shade generally near Greyed-Orange 165 B and C and 164 B, the bud and flower resembling the variety Amberglo (miniature—not patented) in form and size but having a few more petals: and further characterized by a plant of vigorous and compact growth habit, easy to propagate from cuttings, with an abundance of flowers borne usually one to the stem.

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7,608

**HIBISCUS PLANT NAMED 'SWEET CAROLINE'**

**Harold F. Winters, 10717 Kinloch Rd., Silver Spring, Md. 20903**

**Filed Apr. 20, 1990, Ser. No. 513,493**

**Int. Cl.[5] A01H** *5/00*

**U.S. Cl. Plt.—54** **1 Claim**

1. A new and distinctive cultivar of Hibiscus plant named 'Sweet Caroline', substantially as herein shown and described, having pink flowrs and buds with reflexed petal margins, a plant suitable for landscape use that blooms from midsummer until frost.

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7,609

**VARIETY OF GERANIUM NAMED SUNSET**

**Blair L. Winner, Lompoc, Calif., assignor to Denholm Seeds, Lompoc, Calif.**

**Filed May 4, 1990, Ser. No. 519,091**

**Int. Cl.[5] A01H** *5/00*

**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinct variety of Geranium plant substantially as shown and described.

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7,610

**VARIETY OF GERANIUM NAMED SALMON SATISFACTION**

**Scott C. Trees, Elburn, Ill., assignor to Geo. I. Ball, Inc., West Chicago, Ill.**

**Filed May 4, 1990, Ser. No. 519,300**

**Int. Cl.[5] A01H** *5/00*

**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinct variety of Geranium plant substantially as shown and described.

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7,611

**ALSTROEMERIA NAMED STAPURZUL**

**Jacob van Andel, Aalsmeer, Netherlands, assignor to Van Staaveren B.V., Netherlands**

**Filed May 7, 1990, Ser. No. 520,353**

**Int. Cl.[5] A01H** *5/00*

**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinctive Alstroemeria plant, substantially as herein shown and described, characterized by large blossoms of an overall violet purple coloration, the outer petals being of a generally ovate-cuneate form and hexagonal arrangement, the inner petals being of a long ovate form with the upper pair substantially parallel with each other and extending in a radially opposite direction than the third petal of the inner petal group, each having a white central body portion and covered from end to end with numerous dark longitudinal purple pencil stripes.

# PATENTS

## GRANTED JULY 30, 1991

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| 428-328 | 5,035,856 |
| 425-371 | 5,035,889 |
| 514-333 | 5,036,011 |
| 522-172 | 5,036,117 |
| 524-361 | 5,036,143 |
| 524-101 | 5,036,151 |
| 235-493 | 5,036,210 |
| 310-323 | 5,036,245 |
| 335-272 | 5,036,368 |
| 361-133 | 5,036,421 |
| 371-032 | 5,036,518 |

# PATENTS

## GRANTED JULY 30, 1991

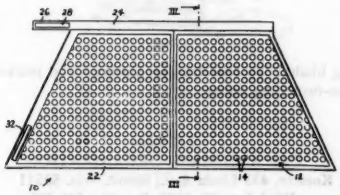
### ERRATA

# PATENTS

## GRANTED JULY 30, 1991

## GENERAL AND MECHANICAL

**5,034,998**
**PROTECTIVE DEVICE FOR REDUCING INJURY FROM FALLS**
**Rodger E. Kolsky, Schenectady, N.Y., assignor to HPI Health Protection, Inc., Albany, N.Y.**
**Filed Jun. 12, 1990, Ser. No. 537,086**
**Int. Cl.[5] A41D** *13/00*
**U.S. Cl. 2—2** **25 Claims**




1. A protective device for reducing incidence of injury from falls, comprising:
- a sheet of flexible polymeric material provided with an array of fluid filled chambers; and
- attachment means for temporarily securing said sheet around a person's hips, said attachment means including exactly one tensile belt-type strip, said strip being disposed along one edge of said sheet, said attachment means further including releasable fasteners at spaced apart locations along said strip.

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**5,034,999**
**NURSING BIB**
**Karen A. Lubbers, P.O. Box 652, Ulysses, Kans. 67880**
**Filed Jan. 18, 1990, Ser. No. 467,019**
**Int. Cl.[5] A41D** *1/20, 1/22*
**U.S. Cl. 2—104** **6 Claims**

1. A nursing bib for covering a mother and infant while nursing comprising;
- a drape (**10**) having body attachment means and defining a unitary coextensive panel (**11**) having an extent shrouding at least the front of the mother's upper torso, said drape panel (**11**) including substantially horizontal single top (**11***c*) and bottom edges (**11***b*) bounded by a pair of substantially vertical lateral edges (**11***a*, **11***a*),
- said body attachment means including a neck band (**12**) affixed to said drape panel top edge (**11***c*) and having opposite ends (**15**, **16**) provided with cooperating attachment means (**17**) thereon,
- said drape panel (**11**) including a portal assembly (**18**) juxtaposed the area of the mother's breast as located therebeneath,
- said portal assembly (**18**) including an aperture (**19**) in said drape panel (**11**) defining a substantially rectangular configuration,
- a flap (**21**) spanning and normally enclosing said aperture (**19**) and having a plurality of edges (**22**, **22***a*, **23**, **23**) including opposite side edges (**23**, **23**), a bottom edge (**22***a*) and an uppermost top edge (**22**),
- means attaching said flap side and bottom edges (**23**, **23**, **22***a*) to said drape panel (**11**) to normally maintain said flap (**21**) in a position closing off said aperture (**19**) to completely shroud said mother's breasts and nursing infant,
- said flap top edge (**22**) disposed substantially normal to and intermediate the mother's line of sight between the mother's eyes and breasts, whereby
- said mother may view said nursing infant without exposure to the eyes of other persons in front, by displacement of said flap top edge (**22**) outwardly of said aperture (**19**) as this displacement allows of downwardly directed visual access to the nursing infant substantially solely along a generally vertical line of sight between said mother's eyes and her breasts.

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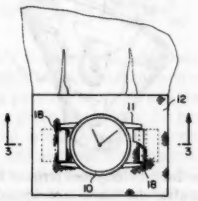
**5,035,000**
**SHIRT CUFF WATCH**
**Jan H. Matthias, 1509 N. Beverly Dr., Beverly Hills, Calif. 90210**
**Filed Apr. 24, 1989, Ser. No. 343,787**
**Int. Cl.[5] A41B** *7/00*
**U.S. Cl. 2—123** **5 Claims**




2. In a garment having a cuffed sleeve to be worn in combination with a wrist watch having a pair of retaining pins attached thereto for retaining a watch band, comprising;
- a cuff having a pair of elongated apertures therethrough in a spaced apart relationship approximately coinciding with the spacing between said retaining pins;
- a pair of retaining straps each having a first end and a second end, said first ends of said retaining straps attached to an outer surface of said cuff adjacent to said apertures; and
- mating fastening means for detachably fastening said second ends of said retaining straps to an inner surface of said cuff such that said inner surface of said cuff must be exposed to detach said second ends;
- whereby said straps are insertable around said retaining pins in lieu of a watch band, insertable through said elongated apertures, and fastenable to said inner surface of said cuff so that said wrist watch is secured to said outer surface of said cuff.

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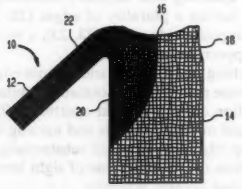
**5,035,001**
**HOT SLEEVE, AND METHODS OF CONSTRUCTING AND UTILIZING SAME**
**Carl A. Novick, 4653 Raymond, Dearborn Heights, Mich. 48125**
**Filed Sep. 10, 1990, Ser. No. 580,090**
**Int. Cl.[5] A41D** *13/08*
**U.S. Cl. 2—125** **3 Claims**

1. A garment to be worn by athletes for retaining a substantial amount of body heat to maintain the temperature of the

muscles needed by the athlete for throwing an object, comprising:

a torso encircling member comprising a first material layer including a first aperture for accommodating the passage of an athletes head and a second aperture to accommodate the passage of an arm which is not used for throwing;




a sleeve member secured to said torso encircling member adapted to cover an arm used for throwing; and

a second layer of material provided on said sleeve member and the portion of said torso encircling member adjacent said sleeve member.

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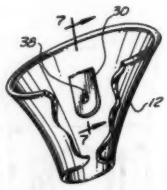
**5,035,002**

**KNOT COVER FOR TIES AND SCARFS**

**Charles F. Knight, Jr., 5610 N. Scottsdale Rd., Scottsdale, Ariz. 85253**

**Filed May 29, 1990, Ser. No. 529,339**
**Int. Cl.[5] A41D *25/08***
**U.S. Cl. 2—152 R** **9 Claims**




1. A knot cover for an elongated strip of fabric to simulate a knot in the fabric after the fabric is wrapped around a portion of the user to allow the free end of the fabric after looping over each other to extend downward in a flowing, retained relationship, said knot cover comprising a body having a circular shape and formed with an inverted truncated triangular configuration and having an upper elongated opening and a lower more circular opening smaller than said upper elongated opening, said inverted triangular configuration including a front portion having an indented section operable to receive a pointed appendage.

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**5,035,003**

**LIQUID HEAT TRANSFER GLOVE**

**Dixie Rinehart, 60 Twining Flats, Aspen, Colo. 81611**

**Filed May 16, 1989, Ser. No. 352,275**
**Int. Cl.[5] A41D *19/00***
**U.S. Cl. 2—159** **4 Claims**

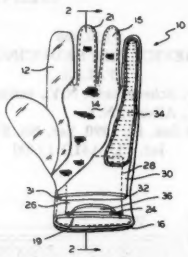
1. A glove for heating or cooling the wearer's hand, said glove having a palm side and a back hand side, comprising:

a fabric shell defining the exterior surface of said glove;

a non-insulating lining within said shell and corresponding in shape to said shell, said lining including a pocket on the palm side of said glove;

a bladder between said lining and said shell partially filled with a liquid on the palm side of said glove, said bladder shaped to extend parallel to substantially the entire palm side of a wearer's hand, and at least part of said bladder adjoining said pocket; and

a non-electrical temperature control device in said pocket, said device producing the desired amount of heat energy so as to affect the temperature of said liquid in said adjoining bladder by heat transfer through said pocket in said non-insulating lining.

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**5,035,004**

**CAP AND MASK ORGANIZATION**

**Eric J. Koester, 433 Linda Ave., Beloit, Wis. 53511**

**Filed Jun. 21, 1990, Ser. No. 541,323**
**Int. Cl.[5] A42B *1/18***
**U.S. Cl. 2—206** **3 Claims**

1. A cap and mask organization, comprising,

a bowl shaped cap member, the cap member including a continuous cap member lower edge, and

the cap member including a visor member defined by a predetermined width extending forwardly of the cap member adjacent the lower edge, and

an open mesh optically transparent sheet selectively securable to the cap member in alignment with the visor, and

the sheet further including a pattern imposed upon the sheet, wherein the pattern retains the outwardly transparent characteristic of the sheet, and

wherein the cap member includes a first hook and loop fastener strip mounted to an interior surface of the cap member adjacent to and in contiguous relationship to the lower edge, wherein the first hook and loop fastener strip is defined by a predetermined length, and the first hook and loop fastener strip is arranged with the visor medially oriented to and bisecting the first hook and loop fastener strip, and the sheet including an upper terminal edge, the upper terminal edge including a second hook and loop fastener strip integrally mounted thereto, wherein the second hook and loop fastener strip is selectively securable to the first hook and loop fastener strip and is defined by a second hook and loop fastener strip length equal to the predetermined length, and

including a split neck strap mounted in alignment with a lower terminal edge of the sheet and projecting orthogonally relative to spaced lateral sides of the sheet, and the split lower neck strap including a third hook and loop fastener strip mounted to each free terminal end of the neck strap to provide selective securement of the neck

strap about an individual's neck and maintain alignment of the sheet relative to the cap member.

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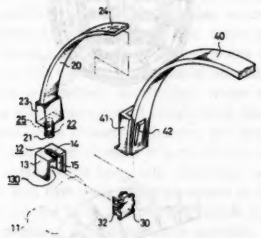
**5,035,005**

## INFLIGHT HEADSET FOR CIVIL AIRCRAFT

**Huang C. Hung, No. 379-14, Pen Kuan Rd., Ta Hwa Village, Niao Sung Hsiang, Kaohsiung Hsein, Taiwan**

**Filed Jul. 27, 1990, Ser. No. 558,769**
**Int. Cl.[5] A42B *1/06*; H04R *25/00***
**U.S. Cl. 2—209** **3 Claims**



1. An inflight headset comprising generally a headband having two downwardly depending ends, a pair of shanks coupled to said downwardly depending ends of said headband, and a pair of earpieces which are coupled to said shanks being provided to be disposed over the ears of a user; a stub being provided on a lower end of each said shank, a first annular groove being formed in said stub; a casing being integrally formed on a housing which receives a respective earpiece, said casing having an open end, a first oblong hole being formed in an upper end of said casing; a cap being provided for enclosing said open end of said casing; said first annular groove of said stub being engaged with said first oblong hole, and said stub being rotatably and frictionally coupled to said casing when said cap encloses said open end of said casing so that said earpieces can be easily adjusted to different rotational directions.

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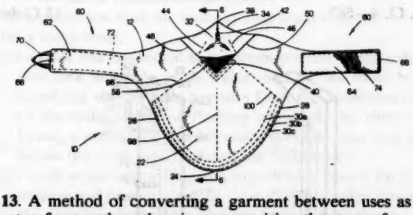
**5,035,006**

## CONVERTIBLE MASK, ASCOT AND VISOR GARMENT AND METHOD OF CONVERSION THEREBETWEEN

**Mary N. Hetz, and Bruce J. Brothers, both ofBend, Oreg., assignors to Hot Cheeks, Inc., Bend, Oreg.**

**Filed Oct. 25, 1989, Ser. No. 426,873**
**Int. Cl.[5] A42B *1/04***
**U.S. Cl. 2—209.1** **28 Claims**



13. A method of converting a garment between uses as an ascot, a face mask, and a visor, comprising the steps of:

providing a garment of a fabric material comprising:

(a) a substantially flat bib portion,

(b) a nose portion and a breathing vent portion adjacent the bib portion, and

(c) securing means adjacent the nose and breathing vent portions for securing the garment on a wearer;

orienting the bib portion to hang downwardly from the nose portion and securing the securing means about a wearer's neck when the garment is to be used as an ascot;

orienting the bib portion to hang downwardly from the nose portion, receiving a wearer's nose with the nose portion, and securing the securing means about a wearer's head when the garment is to be used as a face mask;

folding the garment along the nose portion so the securing means and a part of the nose portion serve as a headband portion and the bib portion serves as a bill portion, placing the bill portion to extend outwardly from a position over a wearer's eyes, and securing the securing means about a wearer's head when the garment is to be used as a visor.

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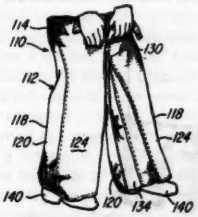
**5,035,007**

## FIREFIGHTER'S TROUSERS CAPABLE OF RECEIVING A BOOTED FOOT

**William L. Grilliot, and Mary I. Grilliot, both of 1986 Home Ave., Dayton, Ohio 45417**

**Continuation of Ser. No. 330,125, Mar. 29, 1989, which is a continuation-in-part of Ser. No. 182,399, Apr. 18, 1988, Pat. No. 4,817,211. This application Apr. 20, 1990, Ser. No. 512,739**
**The portion of the term of this patent subsequent to Apr. 4, 2006, has been disclaimed.**
**Int. Cl.[5] A41D *13/00***
**U.S. Cl. 2—227** **7 Claims**



1. A firefighter's trousers which are easily donned by a firefighter who wears boots, in which each of the boots has a foot part and a leg part, the foot part and the leg part of each of the boots having given dimensions, the trousers comprising outer shell material which has abrasion resistant and flame resistant qualities, and an inner liner material which has thermal insulation and moisture insulation qualities, the inner liner material being covered by the outer shell material, the outer shell material having a torso part and a pair of leg parts, the inner liner material having a torso part and a pair of leg parts, each of the leg parts of the outer shell material and each of the leg parts of the inner liner material of the trousers having a lower portion which is adapted to be positioned above the foot part of the boot of a firefighter who wears the trousers, the leg parts of the inner liner material being tubular and forming a tubular passage significantly greater in dimensions than the given dimensions of the foot part and leg part of the boots, the leg parts of the outer shell material freely encompassing the respective leg part of the inner liner material whereby the boots move easily through the leg parts of the trousers as a firefighter dons the trousers while wearing the boots, the lower portion of each of the leg parts of the outer shell material having a bottom edge, the lower portion of each of the leg parts of the inner liner material having a bottom edge, the bottom edge of the lower portion of the leg parts of the outer shell material and the bottom edge of the leg parts of the inner liner material being above the foot parts of the boots as the boots and trousers are worn by the firefighter, whereby the legs of the firefighter are adequately protected while permitting ease of donning of the trousers while the firefighter wears boots, each of the leg parts of the outer shell material including two separate sections which extend upwardly from the bottom edge of the leg part of the outer shell material, the sections extending substantially the length of the leg parts, fastener means carried by the sections of each of the leg parts of the outer shell material for attaching together the two sections of

the leg parts of the outer shell material, whereby the sections of the leg parts of the outer shell material are attached together after the trousers are donned, the leg parts of the outer shell material forming a tubular passage having a dimension only slightly greater than the given dimension of the leg part of the boots when the sections of the lower portion of the leg parts of the outer shell material are attached together, whereby the lower portion of the leg parts of the outer shell material closely enclose the lower portion of the leg parts of the inner liner material.

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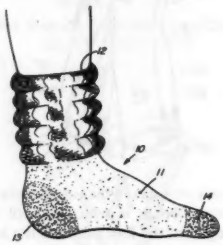
**5,035,008**

## LEISURE WEAR STOCKING

**Sharron L. Schneider, 1479 Lennox St., North Vancouver, Canada V7H 1X4**

**Filed Feb. 12, 1990, Ser. No. 478,965**
**Claims priority, application Canada, Sep. 29, 1989, 615321**
**Int. Cl.[5] A41B *11/00*; A43B *17/00***
**U.S. Cl. 2—239** **13 Claims**



1. A leisure stocking comprising a foot portion which is of a relatively thin synthetic elastic textile fibre and a lower leg portion which is of a relatively thicker knitted fibrous material.

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**5,035,009**

## PROTECTIVE HELMET AND LINER

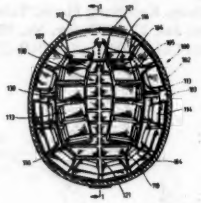
**James C. Wingo, Jr., Stafford, Tex., and Nelson Kraemer, Mt. Prospect, Ill., assignors to Riddell, Inc., Chicago, Ill.**

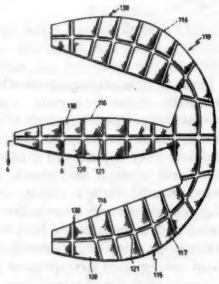
**Filed Sep. 27, 1990, Ser. No. 589,387**
**Int. Cl.[5] A42B *3/00***
**U.S. Cl. 2—414** **20 Claims**

1. For use in a protective helmet having an interior surface, portions of the interior surface having pad structures having outer surfaces spaced from the interior surface of the helmet and disposed thereon in a spaced relationship, and other portions of the interior surface being exposed in the spaces between the pad structures, a replaceable, removable liner comprising:

at least one sheet of sound deadening material having a peripheral surface conforming to, and fitting within, the spaces between the pad structures; and

the at least one sheet of material having an upper and a lower surface, the lower surface being disposed adjacent the interior surface of the helmet, the upper surface being spaced from the interior surface of the helmet, the upper surface of the at least one sheet of material being spaced a smaller distance from the interior surface of the helmet than the outer surfaces of the pad structures, whereby the





liner may be inserted in the helmet and reduce the transmission of sound within the helmet.

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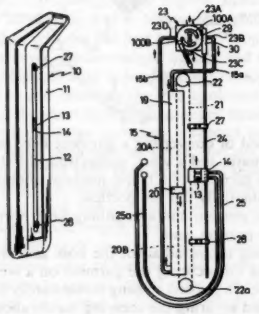
**5,035,010**

## RECIPROCATING SHOWER DEVICE FOR HUMAN USAGE WHEN SHOWERING

**Jun-ichi Sakamoto, Yawata; Tetsuya Onkura, Katano, and Kouichi Yoshida, Nara, all of Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan**

**Filed Aug. 14, 1989, Ser. No. 398,836**
**Claims priority, application Japan, Aug. 26, 1988, 63-212914; Nov. 15, 1988, 63-288152; Nov. 15, 1988, 63-288153; Jan. 26, 1989, 1-8112; Jan. 26, 1989, 1-17291**
**Int. Cl.[5] A47K *3/20, 4/00***
**U.S. Cl. 4—567** **13 Claims**



1. A shower device comprising a housing having a slit longitudinally elongated substantially in a central part of said hous-

ing, a guide rail provided inside said housing to be disposed along said elongated slit, a slider means supporting a shower nozzle and displaceable for reciprocation along said guide rail, first water passage means for supplying water to said shower nozzle, and a driving means for hydraulically reciprocating said slider means for travel along said guide rail to apply said water ejected from said shower nozzle to and along a user's body, wherein said driving means comprises a drive element operably connected to said slider means so that displacement of said drive element produces travel of said slider means, a change-over valve connected to a source of pressurized water a pair of conduits each communicating with said drive element and said change-over valve for conducting water to and from said drive element for displacing said drive element, said change-over valve supplying pressurized water alternately to said conduits so that each of said conduits alternately defines a supply conduit conducting pressurized water to said drive element and a discharge conduit conducting discharge water away from said drive element, whereby the direction of displacement of said drive element is periodically reversed, said drive means arranged to keep said discharge water isolated from water in said first water passage means so that the pressure of water ejected from said shower nozzle is independent of water and pressure in said discharge conduit.

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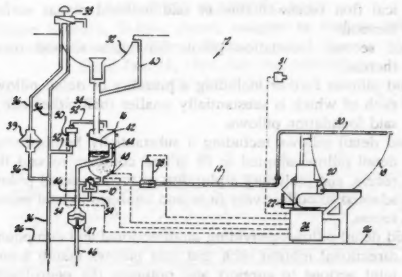
**5,035,011**

## SELF DRAINING SANITATION SYSTEM

**Mike M. Rozenblatt, Manhattan Beach, and Andrew L. Volpe, Lawndale, both of Calif., assignors to MAG Aerospace Industries, Inc., Compton, Calif.**

**Filed Jun. 5, 1990, Ser. No. 533,421**
**Int. Cl.[5] B64D *11/02*; E03D *5/016***
**U.S. Cl. 4—665** **22 Claims**



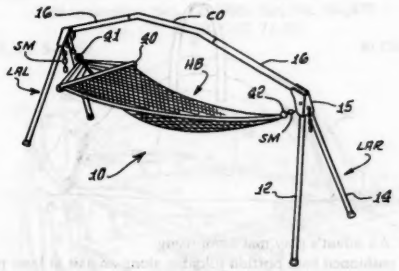
1. A sanitation system, comprising:
(a) a collection tank for holding used wash water;
(b) a toilet bowl;
(c) a rinse line connected to a bottom portion of the collection tank and to a wash water inlet on the toilet bowl supplying water under pressure from the collection tank to the toilet bowl for flushing purposes, the rinse line having a portion disposed beneath the collection tank and below the wash water inlet of the toilet bowl;
(d) wash water controlling and pressurizing means for controlling and pressurizing the flow of wash water through the rinse line from the collection tank to the toilet bowl;
(e) pressurized water means for supplying pressurized water to the system; and
(f) a pressure operated drain valve connected in the portion of the rinse line beneath the collection tank and responsive to the pressurized water means for draining the wash water in the collection tank and rinse line when the pressurized water means is depressurized and to prevent such draining when the pressurized water means valve is pressurized.

**5,035,012**

## PORTABLE HAMMOCK KIT AND IMPROVED PORTABLE HAMMOCK

**James L. Westrich, Algoma, Wis., assignor to Gleason Corporation, Milwaukee, Wis.**

**Filed Aug. 2, 1989, Ser. No. 388,633**
**Int. Cl.[5] A47C *17/04***
**U.S. Cl. 5—139** **16 Claims**



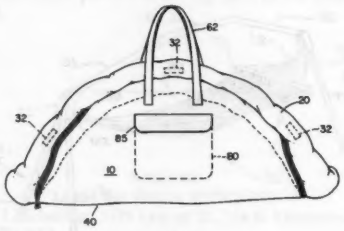

1. In a portable hammock having three modular components defining a hammock stand assembly comprising a pair of tripod-like hammock supporting leg assemblies wherein each leg assembly comprises a shroud, a pair of hammock supporting legs pivotally secured to the shroud adjacent an end of each leg so that the legs lie side-by-side when pivoted to a nonsupporting position for transport purposes and to be pivoted outwardly of the shroud to cause the free ends of the legs to be spaced apart in a releasable, secured hammock supporting position when the free ends of the legs engage a supporting surface, and a third leg for each leg assembly secured at one end thereof to an individual shroud in a nonmovable position and to lie adjacent the pair of supporting legs when said legs are in a nonsupporting, folded position whereby the hammock leg assemblies may be readily transported and set up to support a hammock bed; said third leg being secured to extend outwardly and upwardly of said shroud when the other legs of said shroud are in engagement with a supporting surface, a one piece crossover member having a straight section intermediate its ends with each end being angled downward to align in a straight line with each third leg and each end being adapted to be readily interconnected for securement with said third leg of an individual leg assembly for defining a hammock bed supporting stand when the pair of legs for each pair of leg supporting assemblies have been pivoted to a hammock supporting position and the crossover member is rigidly secured at its ends to each one of the third legs for each leg assembly, the free ends of each third leg and each end of the cross-over member being constructed and defined in a complementary fashion so as to be releasably secured to one another in a non-rotatable relationship with one another, without fasteners, and to be readily disassembled from one another, the shroud for each leg assembly is constructed and defined with means for adjustably securing a preselected style of hammock bed thereto to permit both ends of the hammock bed to be individually adjusted in vertical elevation, said shroud means comprising a securing aperture of a pre-selected configuration for loosely receiving a securing member within the aperture and movable within the aperture to a securable position for engaging a securing member in a non-loose securing position, said securing aperture having a keyhole-like configuration and the securing member is a chain having a plurality of links with one end adapted to be secured to a hammock bed, said keyhole-like configuration is constructed and defined with detent means intermediate the ends of the keyhole-like configuration for positively securing a link of a securing chain by means of the detent means for fixing the elevation of the adjacent end of the hammock bed.

5,035,013

## FOLDABLE INFANT'S PLAY MAT WITH REMOVABLE SIDEGUARD

Stuart J. Bloom, Marlborough, Mass., assignor to Pockets of Learning, Sudbury, Mass.

Filed Jun. 14, 1990, Ser. No. 538,237
Int. Cl.[5] A47D *3/00, 13/06;* A47C *21/08*
U.S. Cl. 5—420 10 Claims




1. An infant's play mat comprising:
a cushioned base portion foldable along an axis at least partially defined by stitching;
a cushioned wall portion following the perimeter of the base portion, the wall portion being foldable along the axis;
a securing means for removably securing the base portion to the wall portion, said securing means comprising a zipper strip attached to the base portion and a mating zipper strip attached to the wall portion;
at least one carrying handle; and
fastening means comprising mating hook and loop fasteners for fastening one side of the play mat to an opposite side of the play mat when the play mat is in a folded position.

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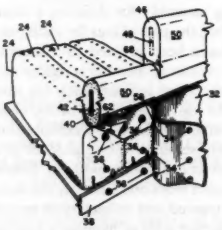
5,035,014

## COMFORT GUARD FOR LOW AIR LOSS PATIENT SUPPORT SYSTEMS

Frederick W. Blanchard, North Charleston, S.C., assignor to SSI Medical Services, Inc., Charleston, S.C.

Filed Aug. 10, 1990, Ser. No. 566,081
Int. Cl.[5] A47C *21/08;* A61G *7/00*
U.S. Cl. 5—424 22 Claims




1. A patient comfort apparatus for use with a low air loss patient support system having an articulatable frame and a plurality of inflatable sacks and side rails which raise and lower against the ends of the sacks, the apparatus comprising:
(a) an elongated cylindrical member,
(i) said cylindrical member defining a resiliently deformable member, and
(ii) said deformable member defining a first longitudinal axis extending along the length of said deformable member;
(b) an outer cover,
(i) said cover surrounding said elongated cylindrical member,
(ii) said cover defining a cavity for receiving said elongated cylindrical member,
(iii) said cover defining a flexible web, and
(iv) said cover being impervious to liquid; and
(c) means for connecting said elongated cylindrical member to the patient support system.

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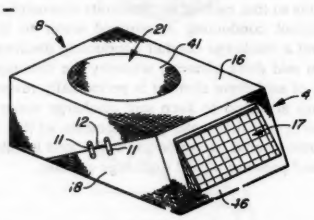
5,035,015

## INFANT FURNITURE

Linda S. Maietta, Rte. 9, Box 86 H.M., Santa Fe, N. Mex. 87505

Continuation of Ser. No. 174,378, Mar. 28, 1988, abandoned.
This application Feb. 28, 1990, Ser. No. 486,317
Int. Cl.[5] A47C *20/00*
U.S. Cl. 5—431 6 Claims




1. An apparatus to optimize the neurological development in an infant placed therein and to position the infant in relation to a care giver to enhance mutual interaction skills, comprising:
a plurality of pillows shaped in different geometrical configurations;
said pillows including first and second foundation pillows, each being substantially wedge shaped and having an inclined planar surface thereon,
said first foundation pillow having a substantially hemispherical first recess therein in said inclined planar surface thereof,
said second foundation pillow having a second recess therein,
said pillows further including a plurality of detail pillows, each of which is substantially smaller than either one of said foundation pillows,
said detail pillows including a substantially hemispherical detail pillow adapted to fit in and conform to said first recess, and including a plurality of further detail pillows adapted to collectively fit in and conform to said second recess,
said detail pillows providing unidirectional and compound-directional motion such that said pillows match human joint actions to support and optimize the neurological development in infants; and
connection means for interconnecting said first and second foundation pillows with said inclined planar surfaces in mating contact to form a substantially rectangular solid.

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5,035,016

## AIR-MAT APPARATUS

Tamotsu Mori, and Katsuji Kikuchi, both of Tokyo, Japan, assignors to Nikko Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 268,870, Nov. 8, 1988, abandoned. This application Nov. 26, 1990, Ser. No. 617,373
Claims priority, application Japan, Nov. 10, 1987, 62-170784[U]
Int. Cl.[5] A47C *27/08*
U.S. Cl. 5—453 9 Claims

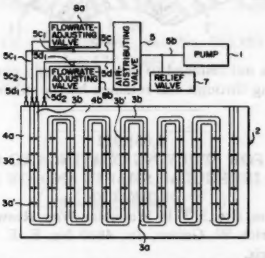
1. An air-mat apparatus comprising;
a substantially rectangular air mat comprising first to fourth air bags closely arranged and air supply ports through which pressurized air is supplied to the air bags, the first bag having no holes and the second bag having air-jetting holes, the third bag having air-jetting holes and the fourth

bag having no holes, wherein the first and second bags comprise a first group, and the third and fourth bags comprise a second group;

pressurized air supplying means for supplying air to the air supply ports of said air mat;

means for maintaining the supplying air at a predetermined pressure;

air-distributing means connected to said pressurized air-supplying means, for periodically distributing the pressurized air to be supplied to the first and second groups of bags;




air flow paths connected between said air-distributing means and said air mat; and

user accessible flow-rate adjusting means connected to said air flow path which is connected to the second and third bags of the first and second groups, respectively, having holes, for individually adjusting the flow rate of the pressurized air flowing through said air flow path toward the second and third bags.

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**5,035,017**

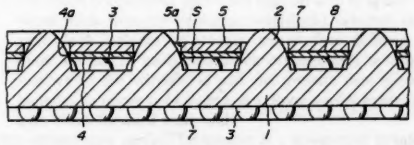
**MAGNETIC SLEEPING MAT**

**Mitsuo Komuro, Tokyo, Japan, assignor to Nippon Athletic Industry Company, Tokyo, Japan**

**Filed Jan. 11, 1991, Ser. No. 640,118**

**Int. Cl.[5] A47C *27/22***

**U.S. Cl. 5—481** **2 Claims**




1. A magnetic sleeping mat, comprising a board consisting of a foamed synthetic resin; a first fibrous sheet superposed on the foamed synthetic resin board; a second fibrous sheet superposed on the first fibrous sheet; permanent magnets distributedly arranged on the second fibrous sheet; and a cover cloth which covers the laminated assembly consisting of the foamed synthetic resin board, the first fibrous sheet and the second fibrous sheet containing the permanent magnets; said foamed synthetic resin board having large projections, which are distributedly formed on its upper surface, and small projections, which are distributedly formed on its upper surface and are located between the large projections, and further having small projections, which are distributedly formed on its bottom surface; said first fibrous sheet having holes, which have been formed therethrough, and being superposed on the upper surface of the foamed synthetic resin board so as to be fitted in its holes with the large projections of the foamed synthetic resin board and to be contacted with the top portions of the small projections thereof; and said second fibrous sheet having holes, which have been formed therethrough, and being superposed on the upper surface of the first fibrous sheet so as to be fitted in its holes with the large projections of the foamed synthetic resin board.

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**5,035,018**

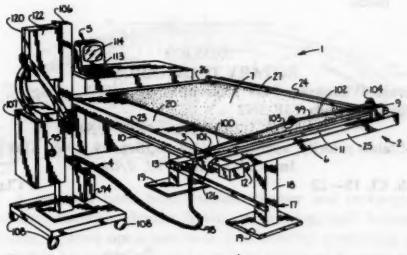
**METHOD OF APPLYING DYE**

**Ronald B. Robbins; John D. Sakowski, both of Duncanville, and William R. Walden, Seagoville, all of Tex., assignors to Sakowski and Robbins Corporation, Dallas, Tex.**

**Division of Ser. No. 406,367, Sep. 12, 1989, Pat. No. 4,979,380. This application Sep. 12, 1990, Ser. No. 581,479**

**Int. Cl.[5] D06B *1/02, 11/00***

**U.S. Cl. 8—150** **10 Claims**



1. A method of applying dye in a selected two dimensional pattern to a dye receiving medium, said method comprising the steps of:

(a) positioning said dye receiving medium on stationary dye receiving medium support means;

(b) providing a dye spray head including spray head motor means operable to cause relative movement along both an x-axis and a y-axis of said spray head relative to said support means;

(c) providing dye valve means controlling communication of said dye from dye supply means to said head;

(d) controlling said motor means to cause said relative movement between said head and said support means through a selected spray path in relation to said support means; and

(e) controlling said valve means to supply said dye to said head to said spray said dye onto said medium at selected locations along said path to thereby apply said dye in said selected two dimensional pattern so as to form an image on said medium.

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**5,035,019**

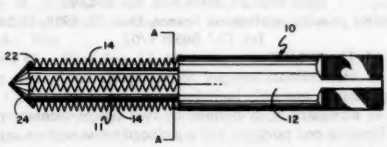
**COLD-FORMING TAP**

**Maureen E. Dias, North Attleborough, Mass., assignor to North Attleboro Taps, Inc., Mass.**

**Continuation of Ser. No. 419,767, Oct. 11, 1989, abandoned, which is a continuation of Ser. No. 201,770, Jun. 2, 1988, abandoned, which is a continuation of Ser. No. 865,892, May 21, 1986, abandoned. This application Jun. 11, 1990, Ser. No. 536,416**

**Int. Cl.[5] B23G *7/02***

**U.S. Cl. 10—152 T** **1 Claim**




1. An improved cold-forming tap for forming threads in a workpiece, comprising:

a triangular-shaped tap body having a forward end with tapered threads, said tap body having three flat sides and

three adjoining corners, each of said corners having an outer edge, said body having a central axis; and

a plurality of concentric threads formed in each of said outer edges of said corners of said triangular-shaped tap body, each of said threads being concentric to the central axis of said tap body and being formed on a radius from said tap's central axis, such threads defining a plurality of lobes at each of said corners of said triangular-shaped tap body, said lobes being configured without any radial relief and having a smaller area of surface engagement than tap lobes embodying radial relief, each of said lobes further defining a plurality of longitudinally-extending narrow lands, each land having a lobe arc width of approximately 9 degrees for contacting and cold forming said threads in said workpiece.

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**5,035,020**

## ROTARY TOOTHBRUSH

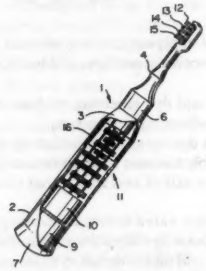
**Gerald Winiewski, 6447 Laurentian Way S.W., Calgary, Alberta, Canada T3E 5N2**

**Filed Jul. 16, 1990, Ser. No. 552,941**

**Claims priority, application Canada, Sep. 29, 1989, 614979**

**Int. Cl.[5] A46B *13/02, 9/04***

**U.S. Cl. 15—23** **4 Claims**



1. A rotary toothbrush comprising elongated casing means; a plurality of annular brush means rotatably mounted in one at least partially open end of said casing means for rotation around a single casing drive means in the casing means for rotating said brush means, said drive means includes motor means in said casing means; gear means for rotation by said motor means; and a plurality of coaxial shaft means connecting said gear means to said brush means, whereby each said brush means can be rotated independently of any other said brush means; and transmission means connecting said drive means to said brush means for rotating at least one said brush means in one direction, and rotating at least one other said brush means in the opposite direction.

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**5,035,021**

## SCRAPER FOR LIQUID DISTRIBUTION PIPES, ESPECIALLY FOR PETROLEUM PRODUCTS

**Eugene Le Devehat, Saligny, France, assignor to FMC Corporation, Chicago, Ill.**

**Filed Dec. 20, 1989, Ser. No. 454,092**

**Claims priority, application France, Dec. 20, 1988, 88 16847**

**Int. Cl.[5] B08B *9/02***

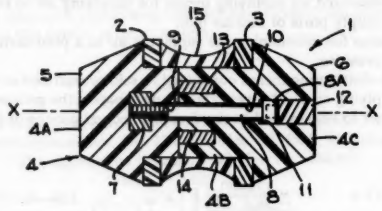
**U.S. Cl. 15—104.061** **18 Claims**

1. A bidirectional scraper for a liquid distribution pipe, comprising an assembly including:

a) an elongated body defined by two complementary parts forming end portions and a reduced cross-section central portion;

b) a pair of removable wear segments surrounding and mounted on the reduced central portion, one segment adjacent one end portion and the other segment adjacent the other end portion; and

c) fastening means releasably connecting together the body parts and the wear segments, said fastening means comprising a nut fastened to one of the body parts and a bolt extending through and retained by the other body part.



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**5,035,022**

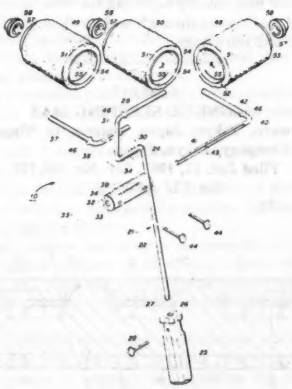
## DEVICE FOR APPLYING COATINGS TO OBJECTS HAVING IRREGULAR SHAPES AND/OR DIVERSE SURFACES

**Joseph Iuliano, Rte. 3, 3714 Woodbine Way, Roswell, N. Mex., and Frederick W. Gaines, Jr., 4860 No. F, E. Fort Lowell, Tucson, Ariz.**

**Filed Dec. 8, 1989, Ser. No. 447,634**

**Int. Cl.[5] B05C *17/02, 21/00***

**U.S. Cl. 015—118** **17 Claims**



1. A device for applying coatings to objects having irregular shapes and/or diverse surfaces comprising: a handle assembly, said handle assembly, said handle assembly having a elongated rod portion having a proximal and distal end, a C-shaped portion integrally formed with said rod portion at said distal end thereof, and a detachable gripping means telescopically mountable on said proximal end of said rod portion; a first roller mounting assembly integrally formed with said handle assembly and including means adapted to receive a removable first roller means thereupon for rotational movement thereabout; a second roller mounting assembly integrally secured to said handle assembly and extending generally normal therefrom, said second roller mounting assembly comprises a L-shaped member having an outreaching arm portion and a base portion, said base portion being integrally secured to said lower arm portion of said C-shaped portion, said outreaching arm portion extending generally perpendicular to said base portion and having an annular flange disposed on the proximal end thereof and friction locking means attachable to the distal end thereof for securing one of said roller means between said proximal and said distal end in operative relationship on said outreaching arm portion; a third roller mounting assembly

detachably secured to said handle assembly in an angularly adjustable relationship thereto and including means adapted to receive a removable third roller means thereupon for rotational movement thereabout; and a plurality of roller means, one being detachably secured to each one of said roller mounting assemblies.

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5,035,023

## VEHICULAR WINDSHIELD WIPER APPARATUS

Charles R. Slingerland, Jr., 3 Aiken Ave., Rensselaer, N.Y. 12144

Filed Jul. 20, 1990, Ser. No. 555,188
Int. Cl.[5] B60S *1/04*
U.S. Cl. 15—250.19 4 Claims

1. A vehicular windshield wiper apparatus for securement of a plurality of windshield wiper support arms relative to an exterior surface of a vehicular windshield wherein each windshield wiper support arm defines a portion of a vehicular windshield wiper assembly, wherein each support arm includes a resilient wiper blade mounted to the support arm and wherein the apparatus comprises,

a cam block cooperative with each support arm to space the wiper blade from the vehicular windshield, wherein each cam block includes an arcuate cam surface defining an outer surface of each cam block orthogonally arranged relative to the windshield and the arcuate cam surface includes an upper apex edge and a downwardly extending cam block forward wall, and

the arcuate cam surface terminates at a lowermost terminal end and further includes an abutment surface in confronting relationship to the arcuate cam surface to accommodate a windshield wiper arm thereon, and a mounting block including

a first plate secured to the cam block to adjustably arrange the cam block relative to the mounting block, and

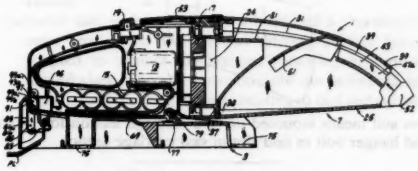
wherein the mounting block further includes a second plate orthogonally arranged and integrally secured to the first plate, the second plate and the first plate defining a "T" shaped cross-sectional configuraton, and the second plate including a top row of through-extending aligned bores orthogonally directed through the second plate, and a bottom row of through-extending aligned bores spaced below and parallel to the top row of through-extending aligned bores, wherein the bottom row of through-extending aligned bores are orthogonally directed through the first plate, and the cam block including a relief slot directed orthogonally into the cam block from the forward wall and wherein the relief slot defines a predetermined configuration complementary of that defined by the second plate.

5,035,024

## PORTABLE WET/DRY VACUUM CLEANER AND RECHARGING BASE

Robert E. Steiner, County of St. Louis, Mo., and Daniel S. Soultanian, Bristol, Va., assignors to Emerson Electric Co., St. Louis, Mo.

Continuation of Ser. No. 473,332, Feb. 1, 1990, Pat. No. 5,005,252, which is a continuation of Ser. No. 274,724, Nov. 9, 1988, Pat. No. 4,899,418, which is a continuation of Ser. No. 77,234, Jul. 24, 1987, abandoned. This application Aug. 24, 1990, Ser. No. 571,722
Int. Cl.[5] H01M *10/46*
U.S. Cl. 15—339 3 Claims



1. A portable hand held vacuum cleaner and recharging base, said vacuum cleaner having a housing, said housing including at least one outer face, said housing containing rechargeable battery means and a pair of electrical housing terminals electrically connected to the rechargeable battery means, said pair of housing terminals including contact surfaces which are exposed along the outer face of said housing, said recharging base having a frame adapted to receive a portion of said housing therein, said frame having at least one outer face, said frame further including a pair of electrical frame terminals electrically connectable to a source of electrical energy, said pair of frame terminals also including contact surfaces which are exposed along the outer face of said frame, said exposed pair of frame terminal contact surfaces being positioned for cooperative electrical connection in sliding frictional engagement with the exposed pair of housing terminal contact surfaces to permit recharging of the rechargeable battery means, said housing and frame having spaced cooperating resilient interengaging means for applying an interlocking force between said housing and frame in order to releasably interlock said housing and frame together, said exposed housing and frame terminal contact surfaces being located in an area adjacent at least one of said spaced cooperating resilient interengaging means, said exposed housing and frame terminal contact surfaces engaging one another in sliding frictional electrical engagement and disengagement along the outer faces of said housing and frame when said housing and frame are releasably engaged and disengaged relative to one another.

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5,035,025

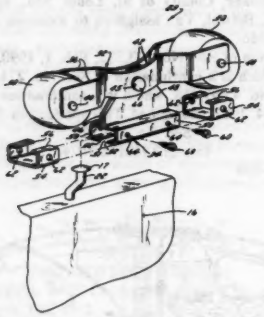
## TRUNDLE TROLLEY FOR A SLIDING DOOR TRACK ASSEMBLY

Jerry R. Morris, South Bend, Ind., and George A. Squires, Madison, Wis., assignors to Combo Corporation, Elkhart Lake, Wis.

Filed Jan. 23, 1990, Ser. No. 468,923
Int. Cl.[5] A47H *15/00;* E05D *15/06*
U.S. Cl. 16—97 5 Claims

1. A trundle trolley for supporting a sliding door for sliding movement in a track assembly mounted on a building, said trolley comprising a roller section and a carriage section mounted on said roller section, said carriage section including a pair of plates mounted in said roller section in abutting relation, each plate having a three sided box section suspended below said roller section with the edges of the box section

spaced apart to form a slot, a hanger bolt mounted on the top of the door and being aligned in said slot in said carriage section and means mounted on said carriage section for locking said hanger bolt in said slot in said carriage section.



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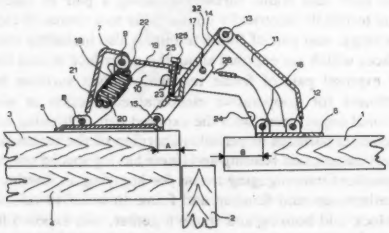
**5,035,026**

## HINGE FOR PIECES OF FURNITURE

**Gatti Carlo, and Zetti Daniele, both of Modena, Italy, assignors to T.G.N. S.p.A., Italy**

**Filed Jul. 11, 1990, Ser. No. 550,994**
**Claims priority, application Italy, Jul. 28, 1989, 28961/89[U]**
**Int. Cl.[5] E05F *1/08***
**U.S. Cl. 16—288** **5 Claims**



1. A hinge comprising first and second base plates, the first plate for fastening to a piece of furniture, the second plate for fastening to a door of the piece of furniture, such that the door is pivotable through an angle from a closed position of 0°, wherein the hinge is contracted, to a maximum pivot angle of up to 170°, wherein the hinge is open,

the first and second base plates each including inner and outer ends,

said hinge further comprising first and second intersecting rocker arms, the first arm being hingedly connected to the inner end of the first base plate, the second arm being hingedly connected to the inner end of the second base plate,

the interlocking rocker arms being pivotably connected to each other at an intersecting pivot point,

said hinge further comprising first and second links, the first link connecting a free end of the first rocker arm to the outer end of the second plate, the second link connecting a free end of the second rocker arm to the outer end of the first plate, said rocker arms and links being disposed within a plane perpendicular to both of said plates,

the second link being fitted with a spring acting between the free end of the second rocker arm and the first base,

the first and second base plates each including at least one pair of bores and at least one pair of slots for allowing the plates to be fastened with screws to the piece of furniture and the door of the piece of furniture, respectively,

the first rocker arm being provided with an abutment screw for cooperation with a portion of the second rocker arm, the abutment screw cooperating with the second rocker arm to limit said maximum pivot angle of the door, the screw being adjustable to limit said maximum pivot angle to less 170° but greater then 90°,

the second rocker arm including an opening for receiving an end of the abutment screw, the abutment screw being received in the opening while said hinge is disposed in said contracted position.

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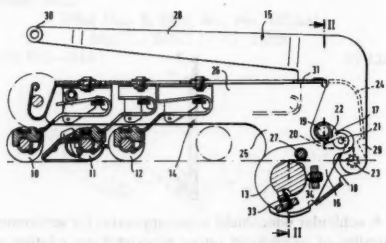
**5,035,027**

## MEANS FOR MANIPULATING A DRAFTING ROLLER CARRIER OF A TEXTILE MACHINE

**Gerhard Grau, Muellheim, and Rudolf Wieland, Filderstadt, both of Fed. Rep. of Germany, assignors to Zinser Textilmaschinen GmbH, Ebersbach/Fils and Spindelfabrik Susen, Schurr, Stahlecker & Grill, Sussen, both of, Fed. Rep. of Germany**

**Filed Feb. 12, 1990, Ser. No. 478,353**
**Claims priority, application Fed. Rep. of Germany, Feb. 11, 1989, 3904108**
**Int. Cl.[5] D01H *5/46***
**U.S. Cl. 19—258** **3 Claims**



1. In a textile machine of the type having a frame and a drafting apparatus, the drafting apparatus having a plurality of lower drafting rollers, a plurality of upper drafting rollers, and a carrier for supporting the upper drafting rollers in respective nip arrangements with the lower drafting rollers, the carrier being pivotally mounted to the frame of the textile machine for pivotal movement in an opening direction from a carrier operating position in which the upper drafting rollers are in nip engagement with the lower drafting rollers to a carrier raised position in which the upper drafting rollers are out of nip engagement for servicing of the drafting apparatus and a closing direction opposite to the opening direction from the carrier raised position to the carrier operating position, means for manipulating the carrier between the carrier operator position and the carrier raised position, comprising:

a handle operable to engage the carrier in a nip maintaining position in which the carrier is maintained in the carrier operating position in which the upper drafting rollers are in nip engagement with the lower drafting rollers, said handle being movable between said nip maintaining position and a nip release position and said handle moving the carrier from the carrier operating position to the carrier raised position during movement of said handle from said nip maintaining position to said nip release position;

means interconnecting said handle and the carrier for selected coordinated movement of the carrier and said handle to thereby permit said handle to effect positioning the carrier in the carrier operating and the carrier raised positions, said interconnecting means including slot means having a slot and slot engaging means, said slot means being movably connected to the frame of the textile machine and said slot engaging means being connected to said handle and being movably received in said slot, said interconnecting means interconnecting said handle and the carrier such that said slot engaging means moves in

correspondence with the pivoting of the carrier in the opening direction when a nip releasing force is applied through the upper drafting rollers to the carrier and such that said slot engaging means moves in correspondence with the pivoting of the carrier in the closing direction when a closing force is applied against the carrier;

operating stop means for preventing pivoting of the carrier in the opening direction out of nip engagement when said handle is in said nip maintaining position, said operating stop means including a concave surface formed on the frame of the textile machine, said slot engaging means being compatibly configured with said concave surface of said operating stop means for nesting engagement therewith and said concave surface being disposed relative to the path of movement of said slot engaging means during movement thereof in correspondence with the pivoting of the carrier in the opening direction to effect nesting engagement of said slot engaging means therewith and thereby prevent further pivoting of the carrier against the nip maintaining force applied by said handle in said nip maintaining position; and

raised position stop means for preventing pivoting of the carrier in the closing direction when said handle is in said nip release position, said raised position stop means including a concave surface formed on the frame of the textile machine, said slot engaging means being compatibly configured with said concave surface of said raised position stop means for nesting engagement therewith and said concave surface being disposed relative to the path of movement of said slot engaging means during pivoting of the carrier in the closing direction to effect nesting engagement of said slot engaging means therewith and thereby prevent further pivoting of the carrier in the closing direction against the force applied by said handle in said nip release position,

said interconnecting means permitting limited movement of said slot engaging means in said slot as said slot engaging means moves in correspondence with movement of said handle in the opening direction, the limited movement being sufficient for said slot engaging means to move out of nesting engagement with said operating stop means to thereby permit said handle to effect movement of the carrier from the carrier operating position to the carrier raised position and said interconnecting means permitting limited movement of said slot engaging means in said slot as said slot engaging means moves in correspondence with movement of said handle during movement of said handle in the closing direction, the limited movement being sufficient for said slot engaging means to move out of nesting engagement with said raised position stop means to thereby permit said handle to effect movement of the carrier from the carrier raised position to the carrier operating position.

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**5,035,028**

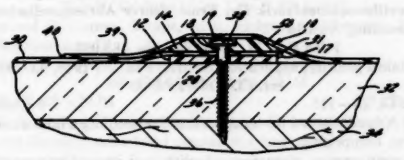
## ROOF FASTENER ASSEMBLY INCLUDING A DUAL PLATE STRESS RELIEVER

**Stuart H. Lemke, 349 River Bluff, Mosinee, Wis. 54455**

**Filed Aug. 18, 1989, Ser. No. 395,962**

**Int. Cl.[5] F04D *5/14***

**U.S. Cl. 24—336** **6 Claims**



1. A roof stress reliever for cooperating with a fastener to secure a roofing membrane to a roof deck, comprising:

a first oblong plate having a generally planar surface;

a second oblong plate constructed of a thermoplastic resin and having a generally planar surface;

means for rotatively coupling said plates so that said surfaces may conform to one another or be spaced apart from one another;

at least one pair of fastener receiving holes passing through said plates, said holes being aligned when said surfaces conform against one another;

engaging means disposed on at least one of said plate surfaces for engaging said membrane and extending into but not through the opposing one of said plates; and

a receptacle for each of said engaging means located in the plate opposing the plate from which said engaging means extend,

wherein said fastener includes a head and a thermoplastic resin coating on at least that portion of said fastener adapted to contact the fastener receiving hole of said second plate, whereby a friction weld can be formed upon rapid rotation of said fastener relative to said second plate.

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**5,035,029**

## SLIDE FASTENER AND FASTENER ELEMENTS THEREFOR

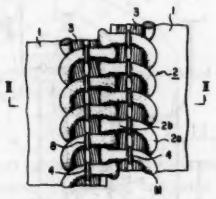
**Yoshiyuki Horita; Kiyoshi Nakayama; Yasuhiko Sugimoto; Norio Kikukawa; Yoshiharu Yamaguchi, and Shigeru Funakawa, all of Toyama, Japan, assignors to Yoshida Kogyo K.K., Tokyo, Japan**

**Filed Mar. 14, 1990, Ser. No. 493,434**

**Claims priority, application Japan, Mar. 16, 1989, 1-62246; Jun. 9, 1989, 1-147333**

**Int. Cl.[5] A44B *19/40***

**U.S. Cl. 24—394** **16 Claims**



1. A slide fastener, comprising: fastener elements formed of at least one fastener element member made of a synthetic resin and having a metallic coating layer with a thickness of 0.001 to less than 1.0 μm formed on a surface thereof so as to give the surface of the fastener element member a metallic luster.

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**5,035,030**

## APPARATUS FOR CONTROLLING AND STRAIGHTENING WEFT AND/OR WARP FABRIC PATTERNS

**Riccardo Pellari, Via Jacopone da Todi No. 11, 50063 Figline Valdarno, Firenze, Italy**

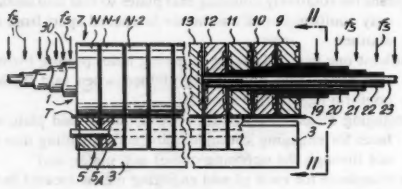
**Filed Mar. 30, 1990, Ser. No. 502,580**

**Int. Cl.[5] D06H *3/12***

**U.S. Cl. 26—51.5** **20 Claims**

1. Apparatus for the control and straightening of a woven fabrics pattern, comprising in combination: at least one computerized opto-electronic reader means for controlling the woven pattern of the fabric in front of a linear transverse inspection zone, said reader being able to detect the woven pattern deviation from a reference pattern; and a set of actuators with relevant servomotors controlled by signals emitted

by said at least one opto-electronic reader means; each of said actuators being disposed to act on a corresponding fabric zone



to locally correct the deviation of the pattern detected by the opto-electronic reader.

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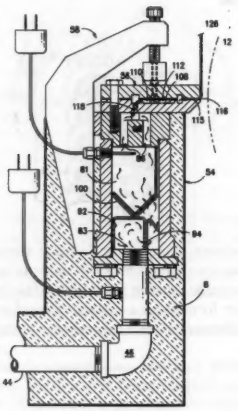
**5,035,031**

## METHOD AND APPARATUS FOR HEATED PRESSURIZED FLUID STREAM TREATMENT OF SUBSTRATE MATERIAL

**John L. Elliott, Spartanburg, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.**

**Filed Apr. 23, 1990, Ser. No. 513,148**
**Int. Cl.[5] D06C *23/00***
**U.S. Cl. 26—69 R** **11 Claims**



1. A method for carving a pattern in a moving substrate of material to impart a visual and tactile effects thereto comprising:

(a) moving a substrate past a pattern station for forming a pattern therein;

(b) directing a continuous sheet of heated pressurized fluid against the surface of said substrate;

(c) directing pressurized cool fluid into selective portions of said heated pressurized fluid to block the path of said fluid;

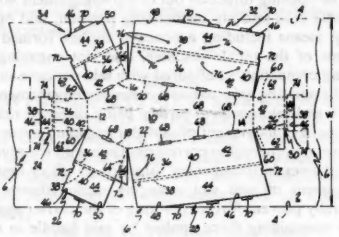
(d) preheating said substrate prior to it being subjected to said step of heating with said discrete streams of pressurized fluid, wherein said preheating step includes directing cool fluid mixed with said heated pressurized fluid towards said substrate and toward a position upstream of the path of said substrate.

**5,035,032**

## CARDBOARD COFFIN

**Donald W. Nutting, 1295 Ithaca Dr., Boulder, Colo. 80303**

**Filed Apr. 6, 1990, Ser. No. 505,728**
**Int. Cl.[5] A63G *17/00***
**U.S. Cl. 27—4** **11 Claims**



1. A coffin constructed from a blank cut from a sheet of a material having edge portions defining a predetermined width and selected from the group comprising cardboard, corrugated cardboard, fiber board or other materials having similar characteristics, the blank comprising:

a central body portion having a length greater than its width and a lengthwise extending longitudinal axis;

said central body portion having a perimeter defined by a plurality of linear score lines comprising a pair of spaced apart parallel linear score lines extending in a direction transverse to said longitudinal axis, a pair of spaced apart relatively short linear score lines extending in a direction inclined to said longitudinal axis and a pair of spaced apart relatively long linear score lines extending in a direction inclined to said longitudinal axis;

a plurality of integral generally rectangularly shaped portions extending from said perimeter of said central body portion so that each of said integral rectangularly shaped portions may be folded around one of said linear score lines to form sidewalls for said coffin;

each of said plurality of generally rectangularly shaped portions having at least one score line parallel to one of said linear score lines defining said perimeter of said central body portion so that each of said generally rectangularly shaped portions may be folded around said at least one score line to form juxtaposed sections;

each of said integral generally rectangularly shaped portions having an exposed edge portion; and

said exposed edge portions of said generally rectangularly shaped portions extending from said pair of relatively long linear score lines having linear segments thereof in a parallel relationship with each other and said longitudinal axis and coinciding with the edge portions defining the predetermined width of said sheet of material to provide said central body portion with a greatest width as possible from said predetermined width of said sheet of material.

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**5,035,033**

## NEEDLE BOARD FOR AN APPARATUS FOR NEEDLING A NON-WOVEN FABRIC

**Rudolf Leuchtenmüller, Schwertberg; Manfred Kapeller, Traun, and Johann Schöfberger, Linz, all of Austria, assignors to Textilmaschinenfabrik Dr. Ernst Fehrer Aktiengesellschaft, Leonding, Austria**

**Filed Feb. 21, 1990, Ser. No. 483,055**
**Claims priority, application Austria, Feb. 27, 1989, 427/89**
**Int. Cl.[5] D04H *18/00***
**U.S. Cl. 28—115** **5 Claims**

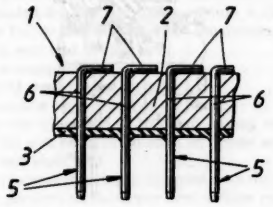
1. A needle board for an apparatus for needling a non-woven fabric, comprising:

a rigid carrier plate formed with two mutually opposite, parallel broadside surfaces and with a plurality of through holes;

an elastic layer having a thickness which is parallel to said broadside surfaces;

a plurality of needles, which are detachably mounted in said carrier plate and extend through said through holes and said elastic layer are retained thereby;

each of said needles has a shank, guided in one of said through holes, and a butt, angled from said shank, and said butts are supported on one of said rigid broadside surfaces;




said elastic layer is spaced from said one broadside surface and engages said shanks;

said rigid carrier plate having a thickness which is multiple times the thickness of said elastic layer; and

said elastic layer performing said retaining of said needles in a non-prestressed state.

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**5,035,034**

## HOLD-DOWN CLAMP WITH MULT-FINGERED INTERCHANGEABLE INSERT FOR WIRE BONDING SEMICONDUCTOR LEAD FRAMES

**Garland D. Cotney, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Jul. 16, 1990, Ser. No. 553,015**

**Int. Cl.[5] H01L** *21/60, 21/68*

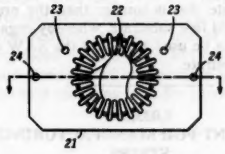
**U.S. Cl. 29—25.01** **9 Claims**

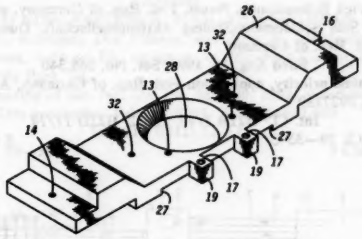
9. A method for clamping the leads of a semiconductor lead frame during a wire bond operation comprising:

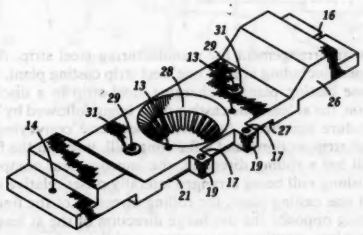
mounting a multi-finger clamp insert onto a clamp frame;

aligning the clamp insert over the leads of the lead frame; and

pressing down upon the leads of the lead frame with the clamp insert in such a manner that each finger of the




clamp insert securely holds at least one of the leads against a supporting structure.

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**5,035,035**

## METHOD OF MOUNTING SAW DEVICES

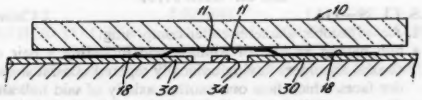
**Stephen P. Rogerson, Woodbridge, and Brian M. MacDonald, Felixstowe, both of England, assignors to British Telecommunications plc, London, England**

**Continuation of Ser. No. 795,496, Dec. 13, 1985, abandoned. This application Jul. 27, 1990, Ser. No. 560,299**

**Claims priority, application United Kingdom, Feb. 20, 1984, 8404398; Sep. 20, 1984, 8423857**

**Int. Cl.[5] H05K** *3/30*

**U.S. Cl. 29—25.35** **13 Claims**




1. A method of mounting a surface acoustic wave (SAW) device comprising a SAW propagating first substrate having a predetermined thickness, onto a second substrate having conductive contact regions thereon, said SAW device further comprising metallized areas including SAW transducer elements and connections bond pads disposed on one face of the SAW propagating first substrate; the method comprising the steps of:

attaching conductive leads to the connection bond pads;

positioning the device face down, over and in immediate proximity to the second substrate; and

attaching the conductive leads to the conductive regions of the second substrate so that (a) the leads run substantially parallel to said face of the first substrate and (b) the first substrate is supported on the leads at a distance from the second substrate that is smaller than the predetermined thickness of said first substrate, whereby organic bonding agents need not be used to mount the SAW device onto the second substrate.

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**5,035,036**

## ARRANGEMENT FOR MANUFACTURING STEEL STRIPS

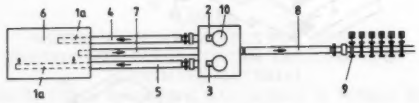
**Heinrich Bohnenkamp, Neuss, Fed. Rep. of Germany, assignor to Sms Schloemann-Siemag Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany**

**Filed Aug. 16, 1990, Ser. No. 568,340**

**Claims priority, application Fed. Rep. of Germany, Aug. 17, 1989, 3927189**

**Int. Cl.[5] B21B *1/46, 13/22;* B22D *11/14***

**U.S. Cl. 29—33 C** **8 Claims**




1. In an arrangement for manufacturing steel strip, the arrangement including at least one steel strip casting plant, the at least one casting plant discharging steel strip in a discharge direction, the at least one casting plant being followed by a first temperature equalizing furnace, a transverse conveying unit for steel strip sections, and a finishing mill, wherein the finishing mill has a rolling direction, the improvement comprising the finishing mill being arranged laterally offset relative to the at least one casting plant, the rolling direction of the finishing mill being opposite the discharge direction of the at least one casting plant, another temperature equalizing furnace being arranged next to the first temperature equalizing furnace, the first equalizing furnace conveying strip sections in the discharge direction of the at least one casting plant, the another temperature equalizing furnace conveying strip sections in a direction opposite the discharge direction toward the finishing mill, the first temperature equalizing furnace having an exit end and the another temperature equalizing furnace having an entry end, the transverse conveying unit being arranged at the exit end of the first temperature equalizing furnace and the entry end of the another temperature equalizing furnace for connecting the temperature equalizing furnaces to each other.

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**5,035,037**

## ADJUSTABLE EXPANDING RUBBER TIRE ROLLER FOR PAPER SCORING MACHINERY

**Ralph D. Sprung, 244 E. Dexter St. #4, Covina, Calif. 91722**

**Filed Jul. 7, 1987, Ser. No. 70,387**

**Int. Cl.[5] B21B *31/32***

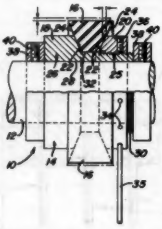
**U.S. Cl. 29—113.1** **2 Claims**

1. An adjustable diameter roller comprising:

a hub having an axis of rotation and including a pair of coaxial shoulders having conically tapered coaxial shoulder faces which face one another axially of said hub and diverge radially outward of said hub, and means for effecting relative axial adjustment of said shoulders toward and away from one another,

an annular elastic tire coaxially surrounding said hub between said shoulders and having a coaxial, substantially cylindrical peripheral surface and conically tapered, radially outward diverging annular side faces contacting said hub shoulder faces, respectively, and wherein

(a) said hub shoulder faces have a common uniform tapered angle over their entire surface area in contact with said tire side faces, (b) said tire side faces are conically tapered at substantially the same angles as their adjacent hub shoulder faces in the normal unstressed condition of said tire, and (c) said hub shoulders are relatively coaxially adjustable toward and away from one another to axially



compress and relieve said tire and thereby effect radial expansion and contraction of the tire to adjust the outer tire diameter substantially without deformation of said peripheral tire surface from its coaxial cylindrical configuration.

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**5,035,038**

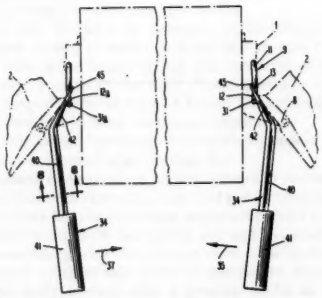
## TOOL FOR REPLACING CORVETTE DOOR HINGE SPRING

**James T. Streett, Pottstown, Pa., assignor to Street Specialty Products Inc., Pottstown, Pa.**

**Continuation of Ser. No. 757,470, Jul. 22, 1985, abandoned, which is a division of Ser. No. 490,433, May 2, 1983, Pat. No. 4,617,712. This application Jul. 8, 1986, Ser. No. 883,159**

**Int. Cl.[5] B25B *27/00***

**U.S. Cl. 29—270** **6 Claims**



1. A hand tool specifically for use in replacing the S-shaped, cam follower spring on the door hinge of a Corvette motor car;

said door hinge including a fixed hinge plate mounted on the car body, a movable hinge plate mounted on the car door with the hinge plates being connected by a pivot pin, the fixed hinge plate on the car body having upper and lower flanges with the upper flange having a keeper hole and an upper keeper slot and with the lower flange having a lower keeper slot in vertical alignment with the upper keeper slot and the lower flange also having a rear keeper slot, the outboard end of which is off-set inwardly from the upper and lower keeper slots;

said cam follower spring being arranged in planar S-shaped form and having a straight, elongated body, an upper bent section on one end of the body, and a lower bent section on the opposite end of the body;

said upper bent section having an inside portion and an outside portion with the inside portion being joined to the

elongated body and the outside portion being spaced from the inside portion and having a keeper slot, the upper bent section being mounted by that the inside portion is disposed in said upper keeper slot and the outside portion is dispose in said keeper hole with the edge of the keeper hole in said keeper slot

said lower bent section having an inside portion and an outside portion with the inside portion being joined to the elongated body and the outside portion being spaced from the inside portion and having a tip, the lower bent section being mounted by that the inside portion is disposed in said lower keeper slot and the tip of the outside portion is disposed in said rear keeper slot;

the hand tool comprising:

an elongated shaft having an axis;

a handle section on one end of the shaft;

an arm on the other end of the shaft having an axis, the axis of the arm being oriented at an obtuse angle to the axis of said shaft; and

when a replacement spring is mounted with the inside and outside portions of the upper bent section respectively disposed in said upper keeper slot and said keeper hole and the elongated body is disposed in said rear keeper slot, the dimensions of the arm and the obtuse angle between the arm and the shaft;

(a) providing for the arm to be inserted between the inside and the outside portions of the lower bent section of the replacement spring so that one edge of the arm can engage the inside portion and the opposite edge of the arm can engage the outside portion;

(b) and also providing that when the arm is inserted between the inside and the outside portions as aforesaid, for the handle section, shaft, and arm to be rotated in a direction toward the center of the car to cause engagement of said one edge and said opposite edge respectively with said inside and outside portions and further to cause twisting of the lower bent section to position the outer portion so that said tip is in vertical alignment with the rear keeper slot and to provide for said tip to be held in said vertical alignment while the lower bent section is tapped upwardly to cause the tip to enter the rear keeper slot.

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**5,035,039**

## METHOD FOR FEEDING SLENDER PARTS

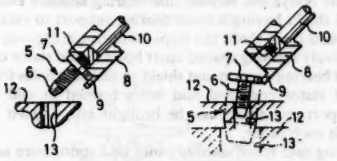
**Yoshitaka Aoyama, 20-11, Makitsukadai 2-chome, Sakai-shi, Osaka, Japan**

**Filed Aug. 11, 1989, Ser. No. 392,513**

**Claims priority, application Japan, Aug. 15, 1988, 63-202948; Aug. 22, 1988, 63-208624; Aug. 22, 1988, 63-208625**

**Int. Cl.[5] B23P** *19/04*

**U.S. Cl. 29—445** **4 Claims**




1. A method for feeding slender parts, one after the other, to a receiving hole in a surface from a front end of a feed rod advanced obliquely downward and substantially horizontally to said surface, the steps comprising feeding said slender part to said front end of said feed rod, said front end of said feed rod having a projecting piece for engaging a side of said slender part adjacent said front end of said rod, engaging one end of said slender part with said front end of said feeder rod and said side of said slender part with said projecting piece on said front end, advancing said feed rod, with said one end of said slender part engaged with said front end of said feed part and said side of said slender part engaged with said projecting piece, along a path obliquely downward and substantially horizontally to said surface until a leading end of said slender part advancing on said feed rod is positioned adjacent to said receiving hole, releasing said slender part from the front end of said feed rod and, as said slender part, released from said front end of said feed rod separates from said front end of said feed rod and travels toward said receiving hole, tipping said end of said slender part released from said front end of said feed rod with said projecting piece on said front end of said feed rod and positioning said slender part in a position in substantial axial alignment with said receiving hole for entering said receiving hole.

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**5,035,040**

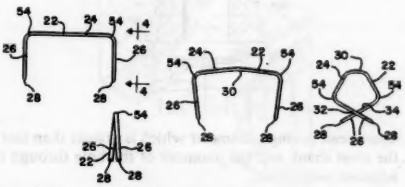
## HOG RING FASTENER, TOOL AND METHODS

**James E. Kerrigan, Des Plaines, and John E. McMenamin, Elmhurst, both of Ill., assignors to Duo-Fast Corporation, Franklin Park, Ill.**

**Continuation of Ser. No. 358,254, May 30, 1989, abandoned. This application Feb. 13, 1991, Ser. No. 641,600**

**Int. Cl.[5] B21D** *53/52*

**U.S. Cl. 29—505** **9 Claims**




1. A method for making an assembly of hog ring fasteners and for applying a fastener of the assembly to a workpiece, said method comprising the steps of:

advancing numerous wires in parallel side by side relation in a flat planar array;

adhering said wires to one another in said array;

severing blanks from an end of said array, each blank including numerous side by side wire segments of equal length extending parallel to one another in a first direction; and

bending said blank to form substantially 90 degree corners along two bending lines to form a U-shaped stick of adhered hog ring fasteners each having a base and two legs;

said severing step including cutting the wires along a cutting line inclined by a bias angle to a perpendicular to said first direction;

said bending lines being parallel to said cutting line and said legs of each hog ring fasteners being offset from one another;

removing a fastener from the stick of fasteners; and

deforming the base of the removed fastener to form the fastener into a loop around a workpiece by moving the legs of the fastener into proximity with one another.

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**5,035,041**

## METHOD TO OBTAIN PRELOAD IN SOLID ONE-PIECE DUCTILE RIVET INSTALLATION

**Josip Matuschek, 1976 Port Dunleigh, Newport Beach, Calif. 92660**

**Filed Jun. 19, 1990, Ser. No. 540,279**

**Int. Cl.[5] B21P** *11/00*

**U.S. Cl. 29—509** **11 Claims**

1. A method of installing a rivet to provide an axial preload on two or more workpieces joined by the rivet, the rivet having a shank, a head on one end of the shank and a tail on the other end of the shank, the method comprising the steps of:

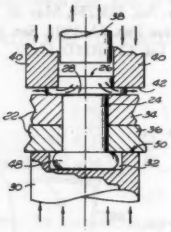
inserting the rivet tail and shank through aligned holes in two or more stacked workpieces with the rivet tail extending beyond the face of one of the workpieces;

providing a two piece tooling assembly comprising an outer tool and an inner tool, with said outer tool having an end face with a cylindrical opening therein in which said inner tool is slidably mounted, and positioning said two piece tooling assembly proximate the rivet head;

providing a tool having a counterbore surface and positioning said counterbore surface proximate the rivet tail;

engaging said rivet head with said tooling assembly such that said inner tool exerts an axially compressive force upon the rivet head and the outer tool exerts a compressive force upon peripheral portions of said rivet head, and engaging said rivet tail with said counterbore surface while said tool assembly engages said rivet head;

deforming said rivet tail with an axially compressive force supplied thereto by said counterbore surface, said step of rivet tail deformation continuing until material comprising the rivet tail is deformed radially outwardly to form a first



upset head having a diameter which is greater than that of the rivet shank and the diameter of the hole through the adjacent workpiece;

discontinuing the axially compressive force applied to the rivet head by removing the inner tool from contact therewith while said outer tool and said counterbore surface continue to supply compressive force to said peripheral rivet head portions and said first upset head, respectively; and

applying continued compressive force upon said peripheral rivet head portions using said outer tool until material comprising said peripheral rivet head portions begins to flow radially outwardly in a manner creating an enlarged rim about said rivet head; and

increasing the compressive force upon the rim to further flatten and deform the peripheral rivet head portions, thereby forming a second upset head.

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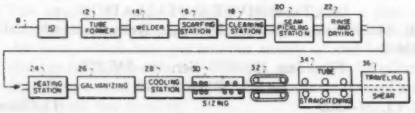
**5,035,042**

## METHOD FOR PRODUCING GALVANIZED TUBING

**Kalyan K. Maitra, Matteson, and Vijay B. Patel, Orland Park, both of Ill., assignors to Allied Tube & Conduit Corporation, Harvey, Ill.**

**Filed Nov. 17, 1989, Ser. No. 438,780**
**Int. Cl.[5] B23P *17/00*; B05D *1/18***
**U.S. Cl. 29—527.4** **3 Claims**




1. A method for making endless lengths of galvanized metal tubing from a metal strip which has a galvanized coating on at least the surface of which is to become the exterior surface of the tubing, said method comprising the following steps:

a) forming said metal strip into tubing as such strip moves along a straight line longitudinal path;

b) continuously welding adjacent lateral edges of said moving strip, thereby providing a seam which completes the tubing;

c) scarfing said seam, thereby causing formation of a scarfed seam area on said exterior surface, and thereby providing a smooth exterior surface on the tubing;

d) applying a quantity of acid substantially only on and along said scarfed seam area;

e) maintaining said acid on said scarfed seam area for an amount of time sufficient such that the acid reacts with metal oxides present on the scarfed seam area;

f) rinsing the exterior surface of the tubing and drying said exterior surface;

g) heating said tubing to a sufficient temperature, such that the galvanized coating on the exterior surface of the tubing to becomes fluid and then;

h) applying molten zinc to said heated tubing on its entire periphery while the galvanized coating remains fluid, thereby forming a circumferentially continuous, integral layer of zinc on said exterior surface of said tubing.

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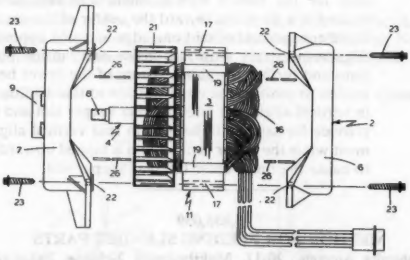
**5,035,043**

## METHOD OF ASSEMBLY OF BEARING SUPPORT STRUCTURE TO THE STATOR ASSEMBLY OF AN ELECTRIC MOTOR

**Barry M. Newberg, St. Louis, Mo., assignor to Emerson Electric Co., St. Louis, Mo.**

**Division of Ser. No. 07/380,146, Jul. 14, 1989, Pat. No. 4,972,113. This application Aug. 16, 1990, Ser. No. 568,028**
**Int. Cl.[5] H02K *15/16*; B23P *19/04***
**U.S. Cl. 29—596** **7 Claims**



1. In a method of assembling an electric motor having a stator assembly including a stator core made up of a stack of core laminations of suitable magnetic material, said stator core having joining means to firmly grip and hold together said stack of core laminations, a central bore extending therethrough, a rotor assembly including a rotor body rotatably received in said bore and a rotor shaft extending endwise from said rotor body, and at least one bearing support end shield, said end shield having a rotor bearing support to receive and journal said rotor shaft, the steps comprising:

selectively forming spaced apart holes in said stator core and said bearing support end shield so that said holes formed in said stator core and said holes formed in said bearing support end shield can be brought into aligned register with each other;

inserting said rotor assembly into said stator core assembly with said rotor body being received in said bore;

centering said rotor body within said bore, thereby creating an air gap having a substantially uniform between said rotor body and said stator core;

installing said bearing support end shield on said stator assembly and on said rotor assembly thereby journalling said rotor shaft in said bearing support and bearing said bearing support end shield against an adjacent lamination of said core with said selectively spaced core holes and said bearing support end shield holes in alignment;

inserting fasteners through said aligned core and bearing support holes and tightening said fasteners thereby draw-

ing said end shield into firm gripping engagement with said core, said joining means for said stator core laminations being preselected distances in spaced position relative said fasteners and said rotor bearing support and thereby creating a resistance to the bending moment along said preselected distance of said core laminations and said fasteners less than the resistance to the bending moment created along said bearing support end shield between said fasteners and said rotor bearing support thereby maintaining said bearing support end shield and rotor bearing support in a stable, squared position with any bending created by fastener tightening occurring among the stack of core laminations of said core assembly rather than said bearing support end shield and rotor bearing support.

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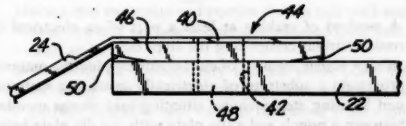
**5,035,044**

## METHOD FOR REMOVING BALL STAKED HEAD GIMBAL ASSEMBLY

**Eyvand E. Toensing, Savage, Minn., assignor to Seagate Technology, Inc., Scotts Valley, Calif.**

**Division of Ser. No. 444,622, Dec. 1, 1989, Pat. No. 5,012,367.**
**This application Jan. 14, 1991, Ser. No. 640,687**
**Int. Cl.[5] G11B *5/42***
**U.S. Cl. 29—603** **4 Claims**




1. A method for removing a magnetic transducer carrying arm from a support arm, the magnetic transducer carrying arm being ball stake mounted to the support art by a ball stake mount, the method comprising:

inserting a prying tool into tool insertion gaps the tool insertion gaps defined by opposing surfaces of the support arm and a mounting plate which is sandwiched between the support arm and the transducer carrying arm, the tool insertion gaps adapted to receive the prying tool; and

applying force to the prying tool for disengaging the ball stake mount wherein the opposing surfaces receive a separation force from the prying tool to cause separation of the support arm and the transducer carrying arm.

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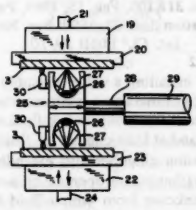
**5,035,045**

## METHOD OF JOINING BIPOLAR BATTERY FRAMES

**Gerald K. Bowen, Cedarburg; Michael D. Eskra, Fredonia, and David C. Belongia, West Bend, all of Wis., assignors to Globe-Union Inc., Milwaukee, Wis.**

**Filed Sep. 10, 1990, Ser. No. 579,615**
**Int. Cl.[5] H01M *6/00***
**U.S. Cl. 29—623.2** **16 Claims**




1. A method of joining thermoplastic bipolar battery frames, comprising the steps of forming a plurality of generally rectangular bipolar battery frames of thermoplastic material and forming a central opening in each frame, mounting a bipolar plate in the opening of each frame with said plate having a lesser thickness than said frame so that opposed surfaces of said frame project outwardly beyond said plate, positioning a pair of frames in spaced relation, moving a pair of back-to-back focused infrared heaters into the space and disposing a focused beam of each heater into registry with the surface of one of the frames to thereby heat and fuse a layer of said opposed surfaces, withdrawing the heaters from said space, and moving the fused opposed surfaces into contacting relation to bond the surfaces together.

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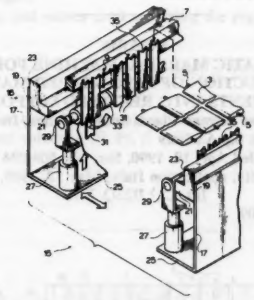
**5,035,046**

## DEVICE FOR ASSEMBLING LOUVER WINDOWS AND DOORS

**Richard W. Cowing, Aurora, Canada, assignor to Sturdi-Built Wood Products Limited, Markham, Canada**

**Filed Jul. 16, 1990, Ser. No. 553,549**
**Int. Cl.[5] B23P *21/00***
**U.S. Cl. 29—714** **7 Claims**




1. Motorized apparatus for the assembly of a louvered structure having a frame and louvers pivotally supported by the frame, each louver comprising a main body portion and smaller diameter rounded louver dowels at opposite ends of the main body portion, the frame comprising side styles with louver dowel receiving openings therealong and end rails held between the styles, said apparatus comprising movable style guides onto which the styles are loaded with the end rails located therebetween, movable louver dowel supports on which the louver dowels are positioned aligned with the dowel receiving openings in the styles, style guide control means for moving said style guides inwardly toward one another to insert the louver dowels into the styles and louver dowel support control means for moving the louver dowel supports away from the louver dowels after an initial and prior to a complete insertion of the louver dowels into the styles.

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**5,035,047**

## ELECTRONIC COMPONENT MOUNTING APPARATUS

**Kotaro Harigane; Kenichi Takahashi, and Hiroaki Honda, all of Tokyo, Japan, assignors to TDK Corporation, Tokyo, Japan**

**Filed Jun. 16, 1989, Ser. No. 367,254**
**Claims priority, application Japan, Jun. 16, 1988, 63-146774; Jun. 20, 1988, 63-151424; Jul. 19, 1988, 63-95544[U]**
**Int. Cl.[5] B23P *19/00***
**U.S. Cl. 29—740** **8 Claims**

1. An electronic component mounting apparatus comprising:

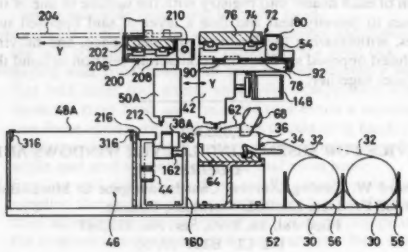
a stationary feed section for feeding electronic components including a plurality of electronic component feed units;

a plurality of transition stations;

a single electronic component extracting head section including a plurality of suction pins for extracting electronic components by suction from said stationary feed section and placing them on said transition stations; and

a plurality of electronic component depositing head sections arranged corresponding in number to said transition stations and each including a plurality of suction pins;

said depositing head sections picking up electronic components by suction from said transition stations to deposit



them on substrates positioned corresponding in number to said transition stations.

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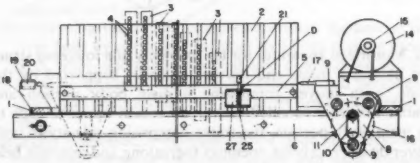
**5,035,048**

## AUTOMATIC MARKING MACHINE FOR THE INTRODUCTION OF RING-SHAPED MARKING ELEMENTS INTO RECESSED SUPPORTS

**Ivana Piana, and Silvano Piana, both of Genoa, Italy, assignors to Grafoplast S.p.A., Italy**

**Filed Apr. 10, 1990, Ser. No. 508,094**
**Claims priority, application Italy, May 12, 1989, 12494 A/89**
**Int. Cl.[5] B23Q *7/10***
**U.S. Cl. 29—809** **17 Claims**



1. A marking apparatus for inserting marking elements into cable markers, each of said markers having a recess extending therethrough, said apparatus comprising:

(a) a frame;

(b) a carriage mounted on the frame for reciprocating movement, and having an elongated pick-off member jointly movable with the carriage between end positions along a travel path that extends along a longitudinal direction;

(c) a rack mounted on the frame;

(d) a plurality of elongated carrier strips, each mounted on the rack for displacement along a transverse direction normal to the travel path, each carrier strip detachably holding a plurality of marking elements arranged in a row along the transverse direction, each marking element bearing a mark and bounding a passage that extends along the longitudinal direction through a respective marking element;

(e) positioning means for selectively positioning a passage of at least one marking element of at least one of the carrier strips in the travel path of the pick-off member;

(f) a holder for holding the marker, and for positioning the recess in, and along, the travel path of the pick-off member, at one of the end positions; and

(g) drive means for moving the carriage, and for moving the pick-off member from the other of the end positions along the travel path to said one end position, said pick-off member extending through the passage of said at least one marking element and detaching said at least one marking element from said at least one carrier strip during movement along the travel path, said pick-off member carrying and inserting said at least one detached marking element into the recess of the marker held in the holder prior to returning to said other end position.

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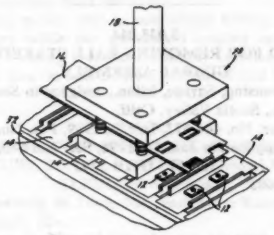
**5,035,049**

## METHOD FOR PRODUCING A STAMPED SUBSTRATE

**Dale K. Wheeler, Fallston, Md., assignor to Black & Decker Inc., Newark, Del.**

**Division of Ser. No. 277,471, Nov. 23, 1988, Pat. No. 4,897,919, which is a continuation of Ser. No. 923,807, Oct. 27, 1986, abandoned. This application Nov. 16, 1989, Ser. No. 438,106**
**Int. Cl.[5] H01R *9/14***
**U.S. Cl. 29—845** **8 Claims**



1. A method of making at least a part of an electrical or electronical circuit comprising the steps of:

locating a planar member of electrically conducting material proximate a substrate of electrically insulating material, said locating step includes situating said planar member between a punch and a die plate with the die plate being disposed between the planar member and the substrate; and

punching said planar member to form a selected portion therefrom, said punching step also being operable to effect interengagement between parts of said selected portion and the substrate, said punching step including the steps of:

(a) passing said punch through said planar member and into said die plate to punch said selected portion from said planar member and deposit said selected portion through said die plate onto said substrate with said interengagement between said parts occurring, and

(b) subsequent to said interengagement between said parts having occurred, mechanically deforming at least one of the previously interengaged parts to positively secure said parts together.

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**5,035,050**

## METHOD OF INSTALLING A VALVE ASSEMBLY IN A COMPRESSOR

**Russell A. Cowen, Brooklyn, Mich., assignor to Tecumseh Products Company, Tecumseh, Mich.**

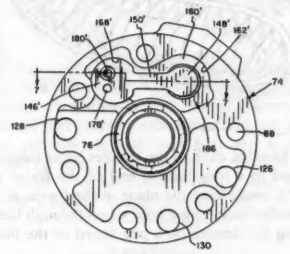
**Division of Ser. No. 311,108, Feb. 15, 1989, Pat. No. 4,955,797. This application Jun. 28, 1990, Ser. No. 545,278**
**Int. Cl.[5] F04B *39/10***
**U.S. Cl. 29—888.02** **4 Claims**

1. A method for installing a valve assembly in a compressor assembly including a crankcase, a compression chamber within said crankcase, means for compressing fluid within said compression chamber, and at least one port in fluid communication with said compression chamber and extending through said crankcase, said port having an opening on a valve-supporting surface of said crankcase from which fluid flows wherein a portion of said surface surrounding said opening comprises a valve seat, wherein the valve assembly is installed on said crankcase surface, comprising the steps of:

providing a reed valve having a substantially round mounting end portion, an opposite free end portion configured to be capable of operably covering said valve seat, and an

elongated intermediate portion extending generally along a central longitudinal axis of said valve;

forming a substantially round well in said valve supporting surface having a bottom surface and a side surface, the diameter of said mounting end portion being slightly less than the diameter of said well for placement of said mounting end portion within said well, said well being spaced from said opening a distance such that when said mounting end portion is placed within the well and the longitudinal axis of said valve is properly oriented said free end portion is operably situated over said valve seat;




placing said mounting end portion within said well such that said free end portion is operably situated over said valve seat; and

establishing an eccentrically located pivot point for said mounting end portion with respect to said well bottom surface, whereby said valve is restrained from significant rotation about said pivot point by engagement of the outer perimeter of said mounting end portion with said well side surface, thereby maintaining proper orientation of said valve.

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**5,035,051**

## METHOD OF MANUFACTURING A BEARING BUSH

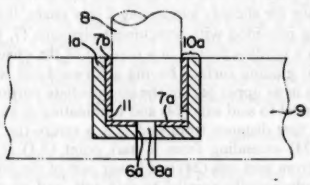
**Yoshio Iijima, Nagoya, Japan, assignor to Daido Metal Company Ltd., Nagoya, Japan**

**Continuation of Ser. No. 738,366, May 28, 1985, abandoned. This application Oct. 16, 1989, Ser. No. 423,532**

**Claims priority, application Japan, Jul. 13, 1984, 59-145855**

**Int. Cl.[5] B21K *1/04*; F16C *33/02***

**U.S. Cl. 29—898.054** **7 Claims**




1. A method of manufacturing a bearing bush having a seam, comprising the steps of:

(a) providing a metallic plate (3*a*) having a steel back layer (1*a*) and a bearing alloy layer (2*a*);

(b) forming a wear dust receiving annular groove (11) in said bearing alloy layer (2*a*);

(c) wrapping said metallic plate into a cylindrical shape with said annular groove (11) facing inward; and

(d) drawing lower end portions of said bearing alloy layer (2*a*) and said steel back layer (1*a*) to thereby form a central bore (6*a*).

**5,035,052**

## METHOD OF ASSEMBLING A HEAT EXCHANGER INCLUDING A METHOD OF DETERMINING VALUES OF PARAMETERS IN A HEAT EXCHANGER, AND DETERMINING WHETHER THE EFFICIENCY OF THE HEAT EXCHANGER IS ACCEPTABLE

**Yoshio Suzuki, Nishikamo, and Michio Hiramatsu, Anjo, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Mar. 8, 1990, Ser. No. 489,189**

**Claims priority, application Japan, Mar. 8, 1989, 1-55610**

**Int. Cl.[5] B23P *15/26***

**U.S. Cl. 29—890.046** **8 Claims**

1. Method of forming parts for a heat exchanger, comprising the steps of:

selecting values for each of parameters Pl, Pf, $\beta$, $\Theta$, in a heat exchanger wherein Pl is a width of a louver formed in a fin of the heat exchanger, Pf is a fin pitch of a fin of the heat exchanger, $\beta$ is a tilt angle of the fin of the heat exchanger and $\Theta$ is a tilt angle of a louver formed in the fin of the heat exchanger;

changing said values until satisfying the expression

$$0.2 \leqq \frac{Pl}{Pf} (\tan\beta + \tan\theta) \leqq 0.45;$$

and forming at least said louver and said fin using the changed values of Pl, Pf, $\beta$ and $\Theta$.

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**5,035,053**

## SHAVING APPARATUS

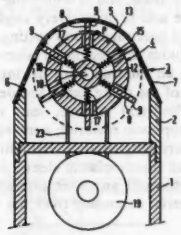
**Albert Hoekstra, Drachten, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.**

**Continuation of Ser. No. 404,915, Sep. 8, 1989, abandoned. This application Jan. 9, 1991, Ser. No. 639,320**

**Claims priority, application Netherlands, Sep. 19, 1988, 8802311**

**Int. Cl.[5] B26B *19/14***

**U.S. Cl. 30—43.6** **8 Claims**



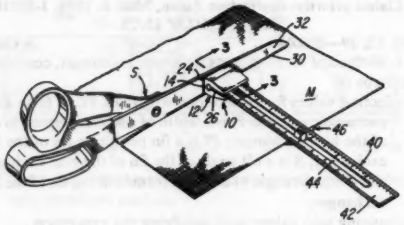
1. A shaving apparatus, comprising an external shaving member formed with hair-entry apertures and an internal shaving member which is drivable relative to the external shaving member and which comprises a carrier for at least one cutter, a portion of the cutter being disposed in a recess in the carrier, wherein said portion of the cutter is made to engage against the carrier by means of three supporting projections formed in said cutter surface which are not disposed in line, said projections engaging walls of said recess in the carrier thereby effecting a clamping action between the carrier and the cutter so as to preclude substantial displacement of the cutter relative to the carrier during shaving.

5,035,054

## CUTTING BLADE MOUNTED APPARATUS FOR CONTROLLED PRECISION CUT OF SHEET MATERIAL

Jane A. Ellenberger, 63 Gunckel Ave., Dayton, Ohio 45410

Filed Sep. 26, 1990, Ser. No. 588,606
Int. Cl.[5] B26B *13/00, 11/00;* A44B *1/04;* A41F *1/00*
U.S. Cl. 30—233 14 Claims



2. Apparatus especially advantageous for use by mechanics, tailors, seamstresses, as well as designers and creators of garments and other articles, who must variously pattern, cut, trim, adjust and alter that on which they work, as circumstances may require, applicable to a flat on the top cutting blade of a scissors, comprising a multi-surfaced element constituting a body for mounting a slide gage rule in an outwardly directed laterally projected relation to the cutting blade to which it is applied, said body including a slit directed inwardly of the body thereof, said body having a bore therein intersected by the innermost limit of the slit and said slit being oriented perpendicular to one surface portion of said body which defines its base.

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5,035,055

## FLEXIBLE DRIVE SHAFT CASING

Timothy J. McCullough, 833 Aurora Rd., Vermilion, Ohio 44089

Filed May 8, 1987, Ser. No. 47,769
Int. Cl.[5] A22C *17/00;* F16C *1/02*
U.S. Cl. 30—276 16 Claims

1. An improved casing for a generally cylindrical flexible drive cable of a meat trimming knife of the type having an annular blade holder mounted on a front end of a handpiece with an annular cutting blade rotably mounted on said holder, in which gear means is mounted in the handpiece and drivingly engages the cutting blade, and in which the drive cable extends into the handpiece and is operatively engaged with the gear means to drive said gear means and cutting blade; wherein the improvement includes a fixed inner sleeve formed with an outer surface and an internal bore having a diameter larger than the diameter of the drive cable and defined by a continuously smooth cylindrical surface, said inner sleeve being formed of a thermoplastic material; a metal wire braid formed of a plurality of crossing strands extending about the outer surface of the inner thermoplastic sleeve providing longitudinal stability thereto; and an outer protective covering of a thermoplastic material extending over the wire braid.

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5,035,056

## BANANA SLICER

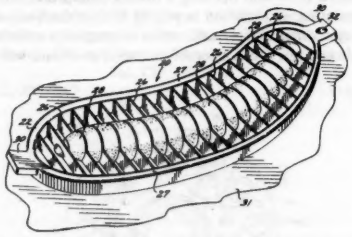
William Sheffield, 33 Tai Tam Road, No. 38E, Tai Tam, Hong Kong

Filed Dec. 12, 1989, Ser. No. 449,540
Int. Cl.[5] B26B *3/00*
U.S. Cl. 30—305 4 Claims

1. A utensil for slicing bananas comprising:

an elongated plastic frame generally defining a plane and configured to circumscribe an area conforming to the shape and area of a typical banana, the frame having curvilinear opposite longitudinal sides;

a plurality of substantially evenly spaced, substantially parallel disposed ribs integrai with the frame and interconnecting the curvilinear opposite longitudinal sides of the frame, each of the ribs being sufficiently thin to form means for cutting transversely through a banana, the spaces between the ribs defining thickness of banana slices cut by the utensil, and



a pair of handles, each of the handles being integral with and attached to a longitudinal end of the frame and curved upward, away from the plane of the frame, at least one of the handles including a hole wherethrough the utensil can be hung for storage on a peg board or the like.

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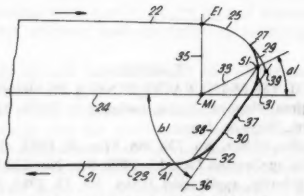
5,035,057

## CHAIN GUIDE FOR POWER CHAIN SAWS

Heinrich Kesper, Sommerweg 26, 3501 Naumburg, Fed. Rep. of Germany

Filed Mar. 12, 1990, Ser. No. 492,606
Claims priority, application Fed. Rep. of Germany, Mar. 11, 1989, 3907812
Int. Cl.[5] B23D *59/00, 57/00, 57/02;* B26D *5/00*
U.S. Cl. 30—383 26 Claims



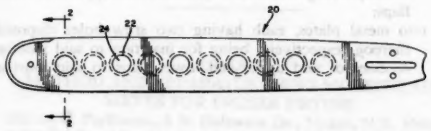
1. A chain guide for a motor-driven chain saw, comprising an elongated rail defining a rear portion, an intermediate portion and a front portion, a longitudinal axis (24) and a peripheral surface for slidably supporting a saw chain, the rear portion being provided with attachment elements (7, 8) engageable with a holding fixture in a housing of the chain saw, the peripheral guiding surface having a forward-run section (22) extending in an upper part of the intermediate portion substantially parallel to said axis (24) and terminating at an end point (E1) at a first distance from said axis, a return-run or cutting section (21) extending from a start point (A1) at a second distance from said axis (24) in a lower part of the intermediate portion substantially parallel to said axis, and an arcuate tip section including a run-in section (25) starting at the end point (E1) and terminating at a vertex point (S1) above said axis and an arcuate run-out section (30) starting at the vertex point (S1) and terminating at the start point (A1) of the cutting section (21), wherein said vertex point (S1) is located within an imaginary sector which substantially is defined by said axis (24), a line (35) perpendicular to said axis (24) and running through said end point (E1), a point (M1) of intersection between said axis (24) and said line (35) perpendicular thereto, and an imaginary circular curve having a center of curvature and a radius, said center of curvature coinciding with said point (M1) of intersection and said radius corresponding to said first distance.

5,035,058

## CHAIN SAW GUIDE BAR

Yozo Date, and Toshihiro Tsumura, both of Miki, Japan, assignors to Suehiro Seiko Kabushiki Kaisha, Miki, Japan

Filed Jul. 9, 1990, Ser. No. 549,619
Int. Cl.[5] B27B *17/02;* B23D *57/02*
U.S. Cl. 30—387 9 Claims




1. Apparatus comprising a chain saw guide bar having oppositely located first and second flat side surfaces, a plurality of recesses formed alternately in said first and second flat side surfaces, each of said recesses extending from one of said side surfaces and partially through said bar, and a lightweight material in said recesses and having outer surfaces which are substantially flush with said side surfaces, said lightweight material having a lighter weight than said bar.

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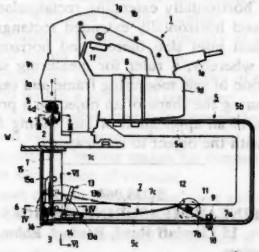
5,035,059

## HAND-HELD SCROLL SAW

Shoji Takahashi, and Kouichi Miyamoto, both of Tokyo, Japan, assignors to Ryobi Ltd., Hiroshima, Japan

Filed Jul. 26, 1990, Ser. No. 557,838
Claims priority, application Japan, Aug. 4, 1989, 1-203614
Int. Cl.[5] B23D *49/06;* B26B *7/00*
U.S. Cl. 30—392 9 Claims



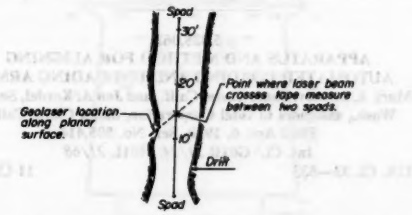
1. A hand-held scroll saw comprising:
- a body including a handle provided at an upper portion of said body, a foot plate provided at a lower portion of said body so as to be slid on a workpiece which is to be cut by said saw, a piston provided over the front portion of said plate so as to be moved upwardly and downwardly, and a motor provided between said handle and said plate so as to move said piston upwardly and downwardly;
- a sawing blade;
- a hung member removably secured to said sawing blade at an upper end thereof;
- a hanger secured to said piston at a lower end thereof and engaging said hung member;
- a U-shaped arm having an upper portion secured to said body and a lower portion located near a lower end of said blade so that said arm does not interfere with said workpiece;
- a pulled-down member removably secured to said blade at said lower end thereof;
- a pulling-down member engaging said pulled-down member; and
- a spring attached to said arm so as to pull downwardly said pulled-down member by an elastic restoring force of said spring, a tension of said spring being adjustable to attendantly optimize a cutting tension of said sawing blade.

5,035,060

## METHOD OF MAPPING UNDERGROUND MINES

Douglas F. Scott, Spokane, Wash., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Jul. 5, 1990, Ser. No. 548,337
Int. Cl.[5] G01C *15/02*
U.S. Cl. 33—228 7 Claims




1. A method of measuring the strike of planar geologic features in an underground mine, comprising the steps of:
- locating two survey spads on a plan view map of a mine;
- attaching a measuring device to extend between said two survey spads in the mine;
- placing a light emitting device on a planar geologic feature on a wall in the mine;
- leveling the light emitting device;
- activating the light emitting device to emit a light beam in a horizontal line intersecting the measuring device;
- marking in the mine the location of the intersection of the light beam and the measuring device;
- marking on the plan view map the position of the light emitting device on the wall and the point where the light beam intersects the measuring device; and
- drawing a straight line on the plan view map between the position of the light emitting device and the point of intersection, wherein the straight line defines the line of strike relative to the survey line and the mine map.

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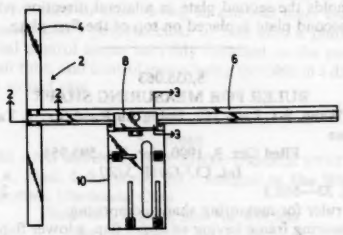
5,035,061

## GUIDE FOR HAND-HELD POWER TOOLS

Timothy Bradbury, 239 Gainsborough Rd., and Andrew Parker, 14-109 Niagara St., both of Toronto, Canada

Filed Jan. 2, 1990, Ser. No. 459,515
Int. Cl.[5] B27B *9/04;* B43L *13/02*
U.S. Cl. 33—430 3 Claims




1. A guide for hand held power tools having a cutting tool used for cutting sheet and stock material having an edge comprising:
- a straight edge section adapted to abut against and move along the edge of said material;
- an arm section mounted on top of and extending substantially perpendicular from said straight edge section;
- a shoe mounted on said arm section and fastened against movement perpendicular to said arm section and being

adapted for movement along said arm, with means to fix said shoe at selected locations thereon;

a base plate fastened at one end by hinge means to said shoe and pivotal about said hinge means between a lowered position in substantially the same plane as said arm section and a raised position above said plane;

means to fasten a power tool on the upper surface of said base plate so that the cutting tool of said power tool extends below the bottom surface of said base plate.

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**5,035,062**

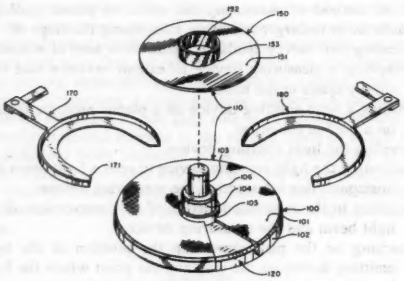
## APPARATUS AND METHOD FOR ALIGNING AUTOMATED LOADING AND UNLOADING ARMS

**Mark A. Leonov, Santa Clara, Calif., and Jan A. Kordel, Seattle, Wash., assignors to Intel Corporation, Santa Clara, Calif.**

**Filed Apr. 6, 1990, Ser. No. 505,414**

**Int. Cl.[5] G01B *21/24;* H01L *21/68***

**U.S. Cl. 33—533** **11 Claims**



1. An apparatus for aligning automated loading and unloading arms comprising:

a. a cap comprising:

i. a first plate substantially in the shape of an electrode;

ii. a lip affixed to the edge of the first plate for holding the first plate stationary in a lateral direction when the cap is placed on top of the electrode;

iii. a pin affixed to a top of the first plate such that the pin is perpendicular to the first plate;

b. a ring comprising:

i. a second plate substantially in the shape of a semiconductor material to be placed on the electrode;

ii. an aperture in the second plate, the diameter of the aperture being the same as the diameter of the pin; and

iii. a collar surrounding the aperture, wherein the collar holds the second plate in a lateral direction when the second plate is placed on top of the first plate.

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**5,035,063**

## RULER FOR MEASURING SHAPE

**Shu F. Wang, 9-1, Lane 161, Hsing An Road Sec. 1, Taichung, Taiwan**

**Filed Oct. 9, 1990, Ser. No. 593,951**

**Int. Cl.[5] G01B *5/20***

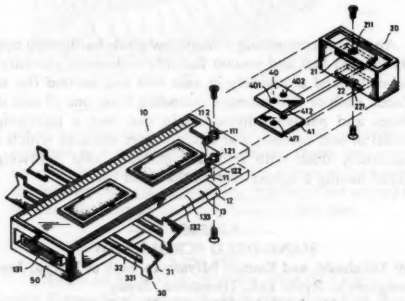
**U.S. Cl. 33—561.1** **2 Claims**

1. A ruler for measuring shape comprising:

a measuring frame having an upper flap, a lower flap and an end flap thereof; said upper flap and lower flap, rectangular in shape and parallel to each other, being integral with the upper and lower edges of said end flap respectively to define a slot and an open end portion; an insert slab of an appropriate width being braced securely to said end flap disposed in an elongated slot which is formed on the mid-section of said end flap to separate said slot as an upper space and a lower space; two mortise recesses being respectively formed on the edges of said upper flap and lower flap, opposite from said end flap; adjacent to said open end portion, said upper and lower flap having at least one screw hole formed thereon;

an insert frame, rectangular in shape, having two mortise recesses of an identical size disposed on one side facing said open end portion and corresponding to the mortise recesses in, said upper and lower flaps respectively, and said insert frame having two screw holes formed thereon corresponding to said screw holes on said upper and lower flaps;

two metal plates, each having two srew holes disposed thereon respectively, being for insertion to said mortise recesses of said upper and lower flaps to said mortise



recesses of said insert frame to ensure the connection of said frame and said inset frame; and

a plurality of elongated sliding rods of an appropriate length, each said sliding rod having butts serving as stoppers disposed at both ends of a rod body, each said rod body having a horizontally extending rectangular slot formed therein; said horizontally extended rectangular slots receiving said inset slab therein and horizontally sliding thereon; whereby, a ruler for measuring shape, with a combination of said measuring frame and said inlet frame for measuring the shape of an object in a precise manner by means of an application of said sliding rods to make contact with the object to be measured.

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**5,035,064**

## LINEAR MEASURING DEVICES

**Ronald J. Care, 15 Llandaff Road, Beufort, Ebbw Vale, Gwent, United Kingdom**

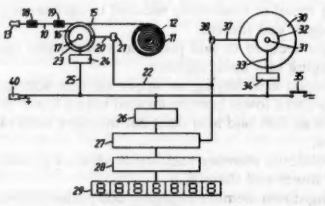
**PCT No. PCT/GB87/00511, § 371 Date Mar. 8, 1988, § 102(e) Date Mar. 8, 1988, PCT Pub. No. WO88/00776, PCT Pub. Date Jan. 28, 1988**

**PCT Filed Jul. 20, 1987, Ser. No. 162,392**

**Claims priority, application United Kingdom, Jul. 19, 1986, 8617700; Nov. 15, 1986, 8627359**

**Int. Cl.[5] G01B *3/10, 3/12***

**U.S. Cl. 33—760** **5 Claims**



1. A measuring device comprising a holder, a movable measuring element normally housed partly within the holder, a sensor for detecting movements of the measuring element and an electrical pulse generator coupled to the sensor, an additional rotary measuring element exposed externally of the

holder and a sensor for detecting movements of the external rotary measuring element, an electronic digital counter circuit connected to each pulse generator, switch means for selectively connecting said counter circuit to a selected one of said pulse generators, and an output circuit connected to the counter circuit.

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**5,035,065**

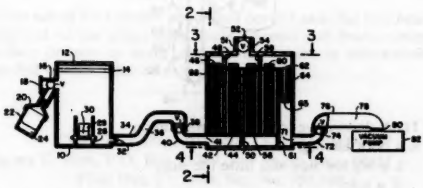
## METHOD AND APPARATUS USING MOLECULAR SIEVES FOR FREEZE DRYING

**Martin C. Parkinson, 6 N. Delaware Dr., Nyack, N.Y. 10960**

**Continuation of Ser. No. 202,142, Jun. 3, 1988, abandoned. This application Dec. 6, 1989, Ser. No. 446,616**

**Int. Cl.[5] F26B *13/30***

**U.S. Cl. 34—92** **2 Claims**



**1.** A freeze drying apparatus utilizing molecular sieve to sequester sublimating water vapor, which comprises:

(A) A drying chamber;

(B) A water vapor condenser having means for vapor communication with said drying chamber;

(C) Said condenser contained a quantity of said molecular sieve held within a mesh column;

(D) Said condenser containing a quantity of said molecular sieve held within a solid wall container;

(E) Said solid wall container being connected in series between said mesh column and a source of vacuum;

(F) Said condenser having means for connecting said condenser to said source of vacuum;

(G) Said mesh column of molecular sieve and said solid wall container of said molecular sieve being positioned in said condenser so that when said condenser is connected to said source of vacuum, and said means for vapor communication is providing vapor communication between said condenser and said drying chamber, said sublimating water vapor is subject to impedance to the flow of said sublimating water vapor due to the presence of said solid wall container of said molecular sieve, and, as a result of said impedance, larger amounts of said sublimiting water vapor is absorbed by said sieve in said mesh column.

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**5,035,066**

## ULTRAVIOLET AIR FLOATATION BAR

**Richard J. Wimberger, DePere, Wis., assignor to W. R. Grace & Co.-Conn., Lexington, Mass.**

**Filed Jun. 7, 1988, Ser. No. 203,138**

**Int. Cl.[5] F26B *13/00***

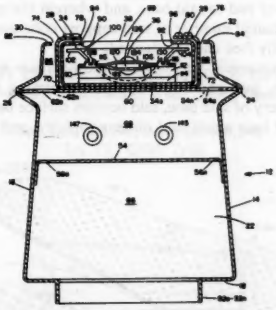
**U.S. Cl. 34—156** **21 Claims**

**17.** An apparatus for ultraviolet radiation enhancement processing of a traveling web of material suspended on a cushion of air comprising:

a. a housing;

b. means for supplying pressurized air to said housing;

c. means removably coupled within said housing for irradiating said traveling web of material with ultraviolet radiation; and,



d. means responsively coupled to said supply means and said housing for cushioning said traveling web on pressurized air.

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**5,035,067**

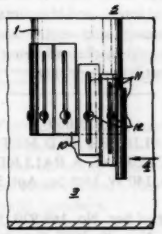
## AIR FLOW CONTROL MECHANISM FOR SPRAY DRYERS

**Dwight H. Bergquist; Gary D. Lorimor, and Thomas E. Wildy, all of Omaha, Nebr., assignors to Henningsen Foods, Inc., Omaha, Nebr.**

**Filed Apr. 25, 1990, Ser. No. 514,219**

**Int. Cl.[5] F26B *19/00***

**U.S. Cl. 34—231** **16 Claims**



**9.** A spray dryer comprising means for controlling the air flow therein, at least one air tube for conducting air into the spray dryer, said air tube having an axis and inner and outer edges substantially perpendicular to said axis, a plurality of individual control means movably mounted on the perimeter of said air tube, said control means being movable in a direction parallel to said axis.

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**5,035,068**

## SHOE AND REMOVABLE SHOE INSOLE SYSTEM

**Franco A. Biasi, Lake Wylie, S.C., assignor to The Wind Pro Corporation, Cincinnati, Ohio**

**Filed Nov. 9, 1989, Ser. No. 434,930**

**Int. Cl.[5] A43B *7/06, 13/38***

**U.S. Cl. 36—3 R** **16 Claims**

**1.** A shoe and ventilated insole system, said system comprising:

an anatomically designed shoe having an outsole, an upper, an interior portion, and at least one air ventilation opening formed in said upper; and

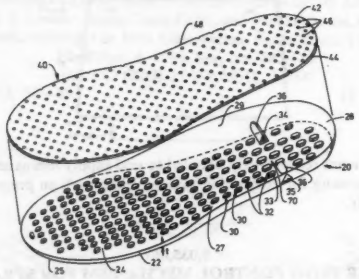
an insole assembly for insertion into said shoe, said assembly comprising,

(a) a base having a substantially impervious bottom walls and an outer periphery, said base being substantially ana-

tomical in design to conform generally to the shape of the bottom of a human foot, and said base further comprising a plurality of upwardly extending compressible support columns, each having a central axis and being attached at its lower end to said base, and wherein the upper ends of a substantial number of said support columns remain substantially free and unattached;

(b) an anatomical pad having a top surface and a bottom surface, said pad substantially conforming to the outer periphery of said base, said bottom surface being attached to said base along said outer periphery, and being effectively spaced from said base by said upwardly extending support columns to form a compressible chamber therebetween; and

(c) means for permitting the flow of air from outside the insole to said chamber, said means for permitting the flow of air comprising at least one collapsible vent in the outer periphery of said base, said vent permitting inflow of air into said chamber when there is no downward compression force on said insole, and obstructing flow of air out of said chamber through said vent when compression forces are imposed on said insole and being generally alignable with said air ventilation opening.



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**5,035,069**

## BALLET SLIPPER AND METHOD OF MANUFACTURING A BALLET SLIPPER

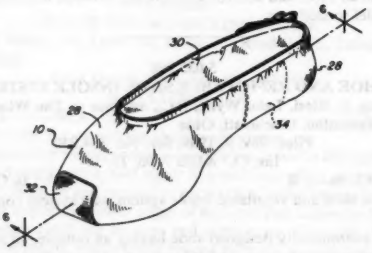
**Elizabeth G. Minden, 140 W. 16th St., Apt. 5W, New York, N.Y. 10011**

**Continuation-in-part of Ser. No. 169,970, Mar. 18, 1988. This application Nov. 20, 1989, Ser. No. 439,449**

**The portion of the term of this patent subsequent to Feb. 20, 2007, has been disclaimed.**

**Int. Cl.[5] A43B *3/00***

**U.S. Cl. 36—113** **20 Claims**



1. A ballet slipper comprising:

an integral shank and toe box molded from a thermoplastic polymeric material, said shank having an upper and lower surface, and said toe box having a platform exterior surface at its forward end and a curved radius exterior surface joining said platform and said shank lower surface; and

a layer of resilient shock absorbing polymeric material covering at least a portion of at least one of the lower surface of said shank, the exterior surface of said platform, and the exterior surface of said radius of said toe box.

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**5,035,070**

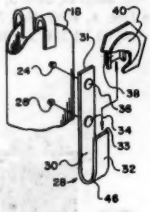
## BOOT LOGO HOLDER

**Cecil D. Gray, Jr., Rte. 3, Box 25, Snyder, Tex. 79549**

**Filed Mar. 7, 1990, Ser. No. 489,495**

**Int. Cl.[5] A43B *23/00***

**U.S. Cl. 36—136** **11 Claims**



11. A decorative logo attachment upon

a. a boot having;

i. a big toe side and little toe side,

ii. a sole,

iii. an instep,

iv. a heel,

v. a foot covering, and

vi. a tubular leg covering with a top;

wherein the improvement comprises the following structure in combination with the above:

b. a U-shaped holder having:

i. an inside flat strip connected to an outside flat strip by a 180 degree bend where said bend is at the bottom of both strips,

ii. said 180 degree bend closer to the instep than to the top of the leg covering,

iii. said U-shaped holder opens upward toward the top of the leg covering, sand

iv. said outside flat strip projects upright and terminates in an outside top end at a height above the bend desireable for displaying a decorative logo and so that a pant leg may be inserted into said U-shaped holder;

c. fastener means on the tubular leg covering on the little toe side of the boot for interconnecting the holder to the leg covering on the little toe side of the boot;

d. the outside top end of the outside strip is located closer to the top of the leg covering than to the instep; and

e. a decorative logo attached to the outside top end of the outside flat strip and located closer to the top of the leg covering than to the instep.

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**5,035,071**

## TRENCH WALL CUTTER

**Erwin E. Stötzer, Aichach, and Peter Teschemacher, Schrobenhausen, both of Fed. Rep. of Germany, assignors to Bauer Spezialtiefbau GmbH, Schrobenhausen, Fed. Rep. of Germany**

**Filed Oct. 10, 1989, Ser. No. 418,023**

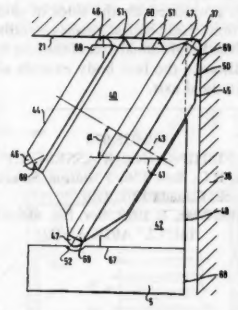
**Claims priority, application Fed. Rep. of Germany, Oct. 14, 1988, 3835123**

**Int. Cl.[5] E02F *5/08***

**U.S. Cl. 37—94** **10 Claims**

1. A trench wall cutter comprising a cutting frame, a cutting wheel having a substantially cylindrical outer surface and a cylinder axis, means mounting the wheel for rotation on the frame about said cylinder axis, a soil-breaking took having a

central axis and a substantially frusto-conical outer surface symmetrically disposed with respect to the central axis, and mounting means mounting the tool on said cylindrical surface



of the wheel for rotation about said central axis, the tool being mounted on the wheel at an angle wherein said frusto-conical surface defines an outer cutting line which is substantially parallel to said cylinder axis.

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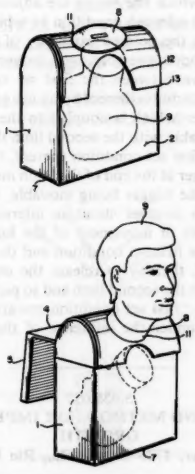
**5,035,072**

**COLLAPSIBLE RIDING COMPANION**

**Rayma E. Rich, P.O. Box 11349, Las Vegas, Nev. 89111**

**Filed Dec. 27, 1988, Ser. No. 290,683**
**Int. Cl.[5] G09F *19/00***
**U.S. Cl. 40—539** **3 Claims**



1. A collapsible riding companion for use as a criminal deterrent comprising, in combination:

a) simulated human head member;

b) a generally rectangular carrying case having the external contour of a human upper torso; said carrying case including plural side walls, a top wall having an outer and inner surface, and a bottom wall to define a hollow interior for storage of said simulated human head member therein, said top wall being hinged to one of said side walls;

c) mounting means for retractably mounting said head member to the outer surface of said top wall in a first extended position and to an inner surface of said top wall in a second retracted position; and

d) a fabric cover for enveloping the outside of said carrying case when said head member is in the first extended position which simulates a seated human head and torso.

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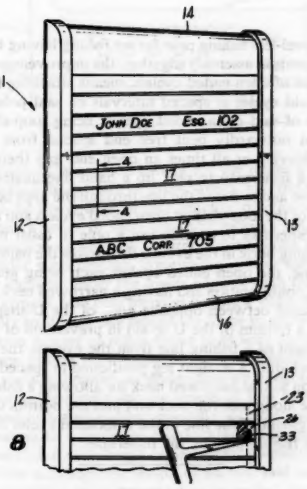
**5,035,073**

**DIRECTORY DEVICE AND METHOD OF OPERATION**

**Robert Laurencelle, 498 Parker Ave., South Meriden, Conn. 06450**

**Filed Jan. 2, 1990, Ser. No. 460,241**
**Int. Cl.[5] G09F *7/00***
**U.S. Cl. 40—585** **9 Claims**




1. A vandal proof directory device having a front side for displaying information comprising:

an open frame means including a pair of opposed, spaced generally vertical members and a pair of opposed, spaced generally horizontal members,

a plurality of transversely disposed movable plates on which said information is carried making an interlocking connection with said vertical members,

resilient means disposed in at least one of said vertical members in contact with one end portion of said plates for stressing said plates compressively,

a key reception means formed in said plates for receiving a key means, operation of said key means is effective to move each of said plates against said resilient means to free said opposite end portion of the plate from the other of said vertical members to remove said plate from said frame,

said key reception means defining a concealed slot,

each of said plates being formed further with a bead means extending along a side thereof,

said bead means having a surface which is coplanar with a surface of said slot,

said bead means surface defining a stop means cooperating with said key means for locating said key means relative to said slot,

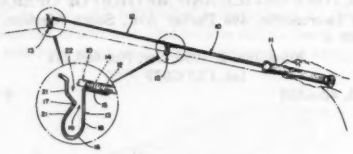
said bead means further defining a spacer for providing access between said plates for insertion of said key means from said front side so that when said key means bottoms on said stop means the key means is rotatable to enter a slot of one of said plates.

5,035,074

## TIP-UP POLE AND/OR ICE FISHING EYELETS

Larry B. Tylkowski, 28631 W. Benjamin Ave., Spring Grove, Ill. 60081

Filed Aug. 25, 1989, Ser. No. 398,589
Int. Cl.[5] A01K *87/04*
U.S. Cl. 43—24 6 Claims



5. In a reel-less fishing pole for ice fishing having handle and pole segments in assembly together, the improvement comprising a series of open ended eyelets, means attaching one end of each of said eyelet at spaced intervals on said pole segment, and each of said open ended eyelets being loop-shaped and having an outwardly bent free end spaced from said pole segment leaving at all times an open end gap there between allowing a fisherman to pick up a hand line unattached to a fishing pole and to drape the line through the gaps between the free ends of the loop-shaped open ended eyelets and the pole to allow a fisherman to quickly use a pole to assist in setting a baited fishing hook in the event a fish strikes the baited hook on a hand line, the open ended eyelets each being generally U-shaped in configuration and having a narrowed neck, said neck being located between opposite ends of the U-shaped of the neck and a bottom of the U to aid in prevention of accidental dislodgement of a fishing line from the eyelets, the U-shaped eyelets including a straight leg positioned in spaced confronting relation to said narrowed neck for allowing a fishing line to slide there along past the neck and into the bottom of the U to aid in lodgment of the line in the associated eyelet to facilitate use of the fishing pole by the fisherman.

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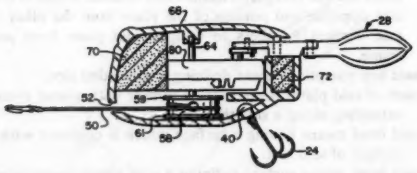
5,035,075

## FISHING LURE

Frank G. Pearce, Garland, Tex., assignor to Powerpak Lures, Inc., Garland, Tex.

Continuation-in-part of Ser. No. 65,301, Jun. 22, 1987, Pat. No. 4,831,767, which is a continuation-in-part of Ser. No. 765,384, Aug. 13, 1985, Pat. No. 4,674,223, which is a continuation-in-part of Ser. No. 595,392, Mar. 30, 1984, abandoned. This application May 23, 1989, Ser. No. 355,990
The portion of the term of this patent subsequent to Jun. 23, 2004, has been disclaimed.
Int. Cl.[5] A01K *15/06*
U.S. Cl. 43—26.2 11 Claims



1. A fishing lure for use in a body of water having a lure body with hooks attached hereto comprising:

an energy storage mechanism,

a line connected to said energy storage mechanism and extending from the lure body, said energy storage mechanism being operable by engagement of said line,

an appendage extending externally of said lure body for movement about a substantially horizontal axis upon operation of said energy storage mechanism.

a gear drive train driven by said energy storage mechanism to drive said appendage, said drive train providing movement to said appendage, and

ballast means positioned on the sides of said lure body, at least a portion of said ballast means extending a distance to the side of the longitudinal axis of the lure which is greater than the distance the lure body extends above or below such longitudinal axis.

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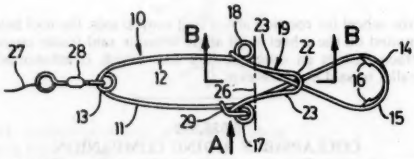
5,035,076

## FISHING HOOK ASSEMBLY

Marcel Martin, P.O. Box 136, 7 Station Street, Green River, New Brunswick, Canada E0L 1E0

Filed Mar. 1, 1990, Ser. No. 486,937
Int. Cl.[5] A01K *83/00*
U.S. Cl. 43—37 12 Claims



1. A fishing hook assembly comprising first and second limbs each of which has one end and an opposed end, with said one ends of the limbs being interconnected, and said opposed ends of the limbs each presenting a reflexly curved hook having a pointed extremity, the limbs being resiliently urged from a first set condition in which the hooks are adjacent to each other towards a second released condition in which the hooks are spread apart with the pointed extremity of each hook on an outer side of the hook assembly, with movement of the hooks as the limbs move between the first set condition and the second released condition thereof being in a plane, and a releasably latch member which is coupled to the first limb and is releasably engageable with the second limb thereby to restrain the limbs in the first set condition thereof, the latch member comprising a trigger at the end of the latch member adjacent to the hooks, with the trigger being movable, by pivotal movement of the latch member about an intermediate pivot axis towards said plane of movement of the hooks as the limbs move between the first set condition and the second released condition thereof, thereby to release the engagement of the latch member with the second limb and so permit movement of the limbs from the first set condition towards the second released condition under the influence of the resilient urging thereof.

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5,035,077

## APPARATUS AND METHOD FOR IMPROVED PLANT GROWTH

Sharon-Joy Palmer, 1725 Brenda Rd., Rio Rancho, N. Mex. 87124

Filed Aug. 31, 1989, Ser. No. 401,666
Int. Cl.[5] F24F *13/10*
U.S. Cl. 47—17 9 Claims

1. A modular efficient horticultural growth chamber comprising:

a sectioned water tight floor;

sectioned water tight sides extending up from said floor forming a chamber;

an elevated frame having a doorway therein;

stairs leading from said doorway down into said chamber;

an algae tank placed on said floor;

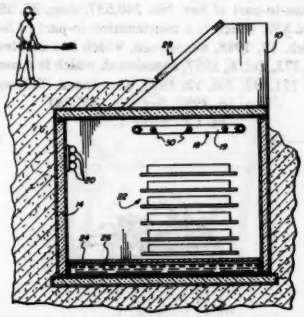
an elevated platform positioned over said algae tank;

trays stacked on said platform having spaces there between;

irrigation system means for providing a fine mist of water to horticultural material placed on said trays;

illumination system means for providing a broad spectrum of light to horticultural material placed on said trays;

controller and timer means, associated with said irrigation system and illumination system, for controlling and timing a sequence of irrigation and illumination periods;



a roof attached to said sides covering said floor, the portion of said roof over said stairs being angled; and

a photovoltaic panel, connected to said controller and timer means, positioned on the portion of said roof over said stairs.

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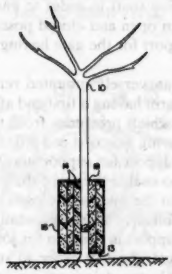
**5,035,078**

## TREE PROTECTION AND TRANSPARENT WRAPPING

**Jerome J. Kipnees, Cranbury, N.J., and Lewis R. Raszewski, Stevensville, Md., assignors to The Crowell Corporation, Newport, Del.**

**Filed Mar. 1, 1989, Ser. No. 317,822**
**Int. Cl.[5] A01G *17/12***
**U.S. Cl. 47—24** **2 Claims**



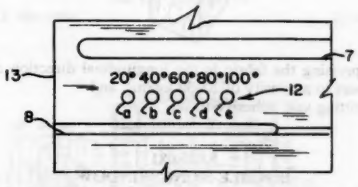
1. In the method of protecting young citrus trees against low temperatures, the step of encircling the low-temperature-sensitive portion of the tree trunk with a thermally insulative plastic foam coat about 40 centimeters tall and at least about six centimeters thick, the coat blocking the passage of thermal radiation, and keeping or treated to keep, rain from getting into the coat or between the coat and the trunk, the foam being cushiony with a yieldability of 0.5 to 0.7 pounds per square inch at 25% compression, and is compressed at least about 10% in thickness and between the coat and the tree trunk, the trunk is wrapped with at least one waterproof turn of a very thin plastic film that conforms to the surface irregularities of the trunk and keeps liquid water from getting to its wrapped portion.

**5,035,079**

## VEGETATION BARRIER INCORPORATING TEMPERATURE COMPENSATION

**George D. Groves, Arnold, Mo., assignor to B & G Consultants, Inc., Arnold, Mo.**

**Continuation-in-part of Ser. No. 188,449, Apr. 29, 1988, Pat. No. 4,903,947, and a continuation-in-part of Ser. No. 418,480, Oct. 10, 1989, Pat. No. D 316,951. This application Dec. 21, 1989, Ser. No. 454,431**
**Int. Cl.[5] A01G *1/00*; E02D *27/00***
**U.S. Cl. 47—33** **23 Claims**




1. A length of vegetation barrier for use under a fence and for eliminating the growth of grass, weeds, and the like, in the vicinity of the lower edge of such fencing, or other structures, and wherein a series of such length of barriers are longitudinally connected end-to-end to firm a continuous vegetation barrier under such fencing, comprising, a base member provided for locating under the lower edge of such fencing, and upon the ground, said base member having a width for extending laterally to at least one side of the fence to allow clearance for any lawn mower or other cutter to at least partially override thereon during lawn trimming, said base member having an upper surface therefor, an upstanding leg integrally formed and extending upwardly for the length of said base member, said upstanding leg extending upwardly for a distance to allow for its fixation to a fence, an interlocking means provided at least at one end of each length of barrier for connection end-to-end with the next adjacent length of barrier, said interlocking means comprising there being an open ended slot provided proximate the location of connecting of the upstanding leg with the base member for the barrier, and said slot extending into the barrier a fixed distance from one end thereof, said slot having a height approximating the thickness of the base member and provided for accommodating the insertion of the end of the next adjacent length of barrier for providing an interlocking of a series of lengths of vegetation barriers together, said interlocking ends of the adjacent lengths of barriers overlapping to provide continuity of coverage in the functioning of the installed barrier for overlying the vegetation throughout the length of the fence to which it attaches, and temperature gauging means provided above said formed slot for limiting the extent of insertion of the next adjacent length of barrier into the next barrier slot to provide space for temperature expansion or contraction after the vegetation barrier has been installed.

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**5,035,080**

## ELEMENT FOR ABOVE-GROUND CULTIVATION

**Bernard Kafka, Rantigny, France, assignor to Isover Saint-Gobain, Courbevoie, France**

**Filed Jul. 3, 1990, Ser. No. 547,245**
**Claims priority, application France, Jul. 3, 1989, 89 08866**
**Int. Cl.[5] A01G *31/00***
**U.S. Cl. 47—59** **5 Claims**

1. A substrate for the growth of plants in the field of above-ground cultivation, comprised of a mineral fiber material, in which the fibers are interconnected by means of a binder, wherein the fibers of the material are randomly arranged without preferred order, from all said substrate formed by the steps of:

collecting individual fibers having an adhesive applied thereto into a sheet of nonwoven fabric having fibers running in a substantially longitudinal direction,

compressing the fabric in the longitudinal direction of the fibers to a density of 20–30 kg/m$^3$, and

permitting said adhesive to set.

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**5,035,081**

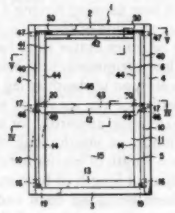
## DOUBLE-HUNG WINDOW

**Yukio Yamamoto, Uozu, and Masahiro Sugiura, Kurobe, both of Japan, assignors to Yoshida Kogyo K.K., Tokyo, Japan**

**Continuation of Ser. No. 359,497, May 31, 1989, abandoned. This application Jun. 4, 1990, Ser. No. 532,174**

**Int. Cl.$^5$ E05D *15/22***

**U.S. Cl. 49—161** **3 Claims**



1. A double-hung window, comprising:

a window frame;

an inner sliding sash mounted so as to be slidably moved up and down freely within said window frame on an inside of said window frame, said inner sliding sash having an inner sliding sash unit mounted thereon and a hinge so that said inner sliding sash unit may be inclined inwardly about said hinge,

an outer sliding sash mounted so as to be slidably moved up and down freely within said window frame on an outside of said window frame, said outer sliding sash having an outer sliding sash unit mounted thereon and a hinge so that said outer sliding sash unit may be inclined inwardly about said hinge,

said window frame having upper and lower frames configured such that when said inner sliding sash is located at a lowermost position and said outer sliding sash is located at an uppermost position an upper portion of said inner sliding sash overlaps a lower portion of said outer sliding sash, whilst when said inner sliding sash is located at an uppermost position and said outer sliding sash is located at a lowermost position a lower portion of said inner sliding sash is spaced apart from an upper portion of said outer sliding sash;

sash locks mounted on respective upper portions of each of said inner sliding sash unit and said outer sliding sash unit, said sash locks being slidably movable between locked and unlocked positions in horizontal directions; and

means for securing said sash locks in each of said locked and unlocked positions, said means comprising:

a knob movable in a direction perpendicular to a sliding direction of said sash locks into and out of securing openings; and means for biasing said knob toward a securing position.

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**5,035,082**

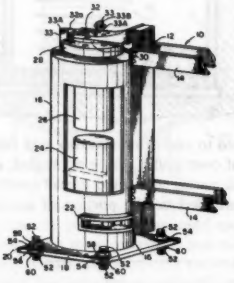
## GATE SUPPORT AND OPERATING MECHANISM

**Colin Butler, Putney, Vt., assignor to Embassy Gates Associates, L.P., Pottsville, Pa.**

**Continuation-in-part of Ser. No. 240,537, Aug. 29, 1988, Pat. No. 4,916,859, which is a continuation-in-part of Ser. No. 157,828, Feb. 19, 1988, abandoned, which is a continuation of Ser. No. 70,272, Jul. 6, 1987, abandoned, which is a continuation of Ser. No. 751,092, Jul. 12, 1985, abandoned. This application Sep. 16, 1988, Ser. No. 245,841**

**Int. Cl.$^5$ E05F *15/02***

**U.S. Cl. 49—334** **12 Claims**



1. An assembly for supporting and operating a gate comprising:

(a) a generally hollow tubular-shaped gate post disposed in a generally upright position with a top end;

(b) a hydraulic power source;

(c) a hydraulically-powered rotary actuator housed within the gate post, said rotary actuator including a rotatable drive shaft having one end which protrudes externally from the top end of the gate post, said hydraulic power source supplying hydraulic power to the rotary actuator to rotate the drive shaft in order to enable movement of the gate between open and closed positions;

(d) an upright support for the gate having an upper end and a lower end;

(e) a drive arm transversely mounted relative to the drive shaft, the drive arm having a first end affixed to the end of the drive shaft which protrudes from the top end of the gate post and having a second end affixed at the upper end of the upright support for supporting the gate relative to the drive shaft to enable the drive shaft to rotatably move the gate between the open and closed positions; and

(f) an arc-shaped follower affixed generally at the lower end of the upright support in position for journalling a bottom portion of the gate post in order to support the gate in position to enable the drive arm to rotatably move the upright support, the follower, and the gate around the gate post.

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**5,035,083**

## UNITIZED WINDOW SYSTEM FOR A VEHICLE DOOR

**J. K. Kruzich, Ann Arbor, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Filed Jul. 30, 1990, Ser. No. 561,856**

**Int. Cl.$^5$ E05F *11/48***

**U.S. Cl. 49—352** **11 Claims**

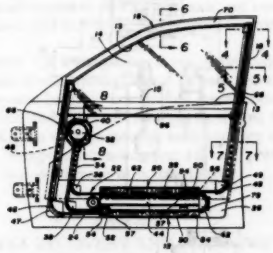
1. Vehicle window regulator subassembly for a vehicle door having an inner panel and an outer panel defining a space therebetween below a beltline of the vehicle, a window open-

ing disposed above the beltline, said window regulator subassembly comprising:

a window;

an inner structural frame extending peripherally adjacent and within a portion of the perimeter of the door;

an endless loop disposed in and connected to a lower horizontally extending portion of the frame and having first and second runs extending substantially parallel to the lower portion of the frame disposed adjacent the lower edge of the door;



means operatively connected to said endless loop for reciprocally driving said first and second runs of said endless loop;

a rear tape drive means operatively attached to a rear edge of the window and the first run of the endless loop;

a front tape drive means attached to a front edge of the window and the second run of the endless loop, wherein said window regulator subassembly controls movement of the window between a closed position in which the window covers the window opening and an open position in which the window is at least partially disposed below the beltline.

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**5,035,084**

## GATE FITTINGS

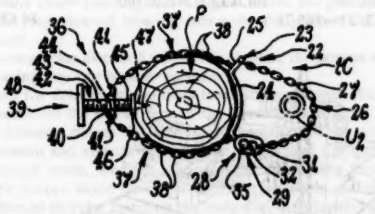
**Robert C. Towns, Dumbalk, Australia, assignor to Keswick Lake Pty. Ltd., Victoria, Australia**

**Filed May 16, 1990, Ser. No. 524,234**

**Claims priority, application Australia, May 17, 1989, PJ4221**

**Int. Cl.[5] E06B *11/00***

**U.S. Cl. 49—381** **8 Claims**



1. A gate fitting for securing a gate to a gateway post, comprising: support means for connecting to a gate frame member; and, mounting means for mounting the support means on a gateway post, the mounting means including a pair of elongate binding members each connected to respective opposite sides of the support means for extending in opposite directions from the support means about the gateway post, and a tensioning unit including a tensioning body to which the binding members are connected, and adjustment means carried by the tensioning body and movable relative thereto, the adjustment means being engageable with the gateway post and movable relative to the tensioning body in order to move the tensioning body radially away from the gateway post in order to tension the binding members about the post and thereby secure the support means in position on the gateway post.

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**5,035,085**

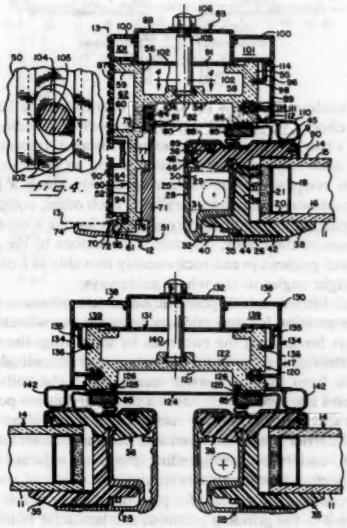
## REFRIGERATOR DOOR ASSEMBLY WITH THERMAL INSULATED DOOR MOUNTING FRAME

**Richard Mamelson, Crown Point, Ind., and Allen Watson, Hopkinsville, Ky., assignors to Ardco, Inc., Chicago, Ill.**

**Filed Jan. 27, 1989, Ser. No. 303,445**

**Int. Cl.[5] E06B *1/04***

**U.S. Cl. 49—504** **32 Claims**



1. In a refrigerator cabinet having a wall formed with an opening, a refrigerator door assembly mountable in said wall opening, said refrigerator door assembly comprising

a door mounting frame,

at least one insulated door comprising a plurality of glass panels mounted on said frame,

said door mounting frame including an L-shaped structural frame member having a side wall positionable adjacent the periphery of said wall opening and a transverse wall extending from said frame member side wall into said opening for defining a stop for said door,

said transverse wall including a central portion in a plane parallel to said wall opening and said portions extending forwardly and rearwardly of said central portion in an H-shape cross-sectional configuration for defining a forwardly opening recess on a forward side of said central portion and a rearwardly opening recess on a rear side of said central portion,

rigid plastic molding means surrounding rear and opposite sides of said frame member and enclosing said rearwardly opening recess for defining an air insulating space on the rearward side of said frame member central portion, and

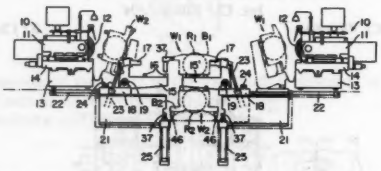
a sealing plate mounted on a forward side of said transverse wall for defining a sealing surface against which said door closes and for enclosing said forwardly opening recess to define an air insulating space immediately adjacent a rear side of said sealing plate.

5,035,086

## CYLINDRICAL GRINDING MACHINE SUITABLE FOR USE ON THE ROLLS OF A ROLLING MILL OR THE LIKE

**Masahide Katsuki, Numazu, and Tsuneo Shoji, Susono, both of Japan, assignors to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan**

Filed Feb. 6, 1990, Ser. No. 475,853
Claims priority, application Japan, Feb. 7, 1989, 1-27870
Int. Cl.[5] B24B *5/00, 47/02*
U.S. Cl. 51—49 4 Claims



1. A loading apparatus for loading two rolls each having a pair of chocks on the end opposite respective grinding positions of a pair of roll grinding machines disposed oppositely on a floor, each roll grinding machine having an abrasive wheel which is reciprocably movable respectively along a pair of wheel guideways extending parallel to each other, comprising:

(a) a pair of opposed roll carrier means having a supporting means of the chock, disposed intermediate to the pair of wheel guideways and reciprocably movable in a direction at right angles to the wheel guideways;

(b) roll lifter means disposed adjacent to a common centerline position located midway between the wheel guideways for loading the two rolls by supporting the chocks on the respective roll carrier means, and for unloading the rolls from the roll carrier means when the roll carrier means are successively moved to the centerline position;

(c) first actuator means for reciprocably moving the pair of roll carrier means between said common centerline position, and respective grinding positions adjacent to the respective wheel guideways; and

(d) second actuator means for pivoting the pair of roll carrier means in the grinding positions and hence for holding the rolls loaded thereon against the abrasive wheels of the roll grinding machines.

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5,035,087

## SURFACE GRINDING MACHINE

**Masanori Nishiguchi; Takeshi Sekiguchi; Ikkei Miyoshi, all of Kanagawa, and Kiyoshi Nishio, Osaka, all of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka; Asahi Diamond Industrial Co. Ltd., Tokyo and Nissei Industry Corporation, Toyonaka, all of, Japan**

Filed Dec. 7, 1987, Ser. No. 129,487
Claims priority, application Japan, Dec. 8, 1986, 61-291901; Dec. 10, 1986, 61-294351
Int. Cl.[5] B24B *7/22*
U.S. Cl. 51—131.1 1 Claim

1. A surface grinding machine, comprising:

at least one wheel head supported movably in the vertical direction;

at least one cup-shaped diamond wheel supported by a rotatable wheel shaft at one end of said wheel head, said diamond wheel having an abrasive grain layer at the lower end of said diamond wheel;

at least one wheel shaft driving motor for rotating said cup-shaped wheel, said motor being supported at the other end of said wheel head;

at least one servomotor for vertically moving said wheel head;

at least one chuck table for fixing a surface of a II–IV group compound semiconductor wafer, predetermined elements being fabricated on said surface;

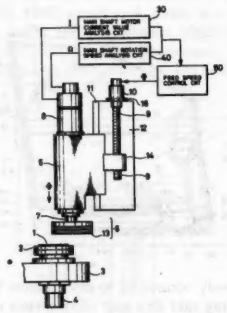
an index table for revolvably supporting said chuck table;

a chuck driving table driving motor for turning said chuck table;

said surface grinding machine further comprising:

a main shaft motor current analysis circuit for detecting the current value of said wheel shaft driving motor

a main shaft rotation number analysis circuit for detecting



the number of revolutions of said wheel shaft driving motor; and

a feed control circuit for controlling said servomotor in such a manner as to decrease, by obtaining grinding resistance from the number of revolutions the feed speed corresponding to a speed at which said wheel head moves down when the grinding resistance is greater than a predetermined resistance value, and increase the feed speed when the grinding resistance is smaller than the predetermined resistance value.

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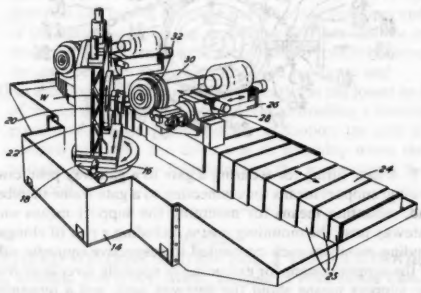
5,035,088

## MACHINE TOOL

**Peter H. Putnam, Enderby, and Michael P. Durcan, Ravenstone, both of England, assignors to Ex-Cell-O GmbH, Eislingen, Fed. Rep. of Germany**

Continuation of Ser. No. 76,293, Jul. 22, 1987, abandoned. This application Dec. 26, 1989, Ser. No. 456,389
Claims priority, application United Kingdom, Jul. 22, 1986, 8617864
Int. Cl.[5] B24B *51/00*
U.S. Cl. 51—165.71 14 Claims



1. A machine tool comprising

a bed,

a workhead for mounting a workpiece to be machined;

a plane of interpolation;

defined locations of a predetermined shape of said workpiece to be machined on said workpiece, said locations

being positionable in said plane of interpolation by a first machining axis means, said first machining axis means being a rotary axis and extending perpendicular to said plane of interpolation, a second rectilinear machining axis means; said second machining axis means being an X-axis and extending parallel to said plane of interpolation and a third rectilinear machining axis means; said third machining axis means being a Y-axis and extending parallel to said plane of interpolation;

support means for said workhead including said first, second and third machining axis means, said support means being supported by said bed,

a working tool rotatable about a tool axis and held by a tool drive means, said tool drive means being supported by said bed, and

control means for controlling a machining operation to obtain said predetermined shape of said workpiece, said control means being in controlling connection with said first, second and third machining axis means for moving said workpiece with respect to said working tool in said plane of interpolation according to said predetermined shape of said workpiece to be machined.

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**5,035,089**

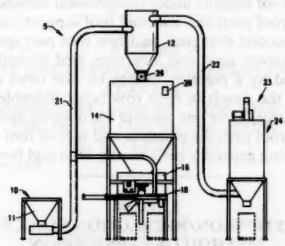
## BLAST MEDIA RECOVERY AND CLEANING SYSTEM

**William R. Tillman, and Robert A. Pauli, both of Solano County, Calif., assignors to Pauli & Griffin, Vacaville, Calif.**

**Filed Jan. 29, 1990, Ser. No. 471,553**

**Int. Cl.[5] B24C *9/00***

**U.S. Cl. 51—425** **21 Claims**



1. A dense particle separator for cleaning dense particles from blasting media, the dense particle separator comprising:

a frame;

a plenum coupled to the frame;

a media chute opening into a region above the plenum for carrying cleaned blasting materials away from the plenum;

a porous stone disposed within the plenum, the porous stone having top and bottom surfaces;

means for delivering materials to be separated into the plenum over the top surface of the porous stone;

air delivery means for delivering compressed air to the plenum and arranged to pass the air upward through the porous stone, wherein in operation, air passing through the porous stone flows through the materials within the plenum thereby agitating the materials and classifying the agitated materials by specific gravity, the higher density materials falling towards the bottom of the plenum over the porous stone and the lower density materials piling over the denser materials and spilling over the plenum into the media chute;

means for moving the plenum between a shut position that retains the denser materials within the plenum and a discharge position which discharges

materials within the plenum; and

a knife carried by the frame and arranged for movement back and forth above the plenum between a position that seals above the plenum to a position that leaves the space above the plenum open, wherein when the knife is positioned in the sealed position, the plenum may be dropped to discharge the materials disposed therein without discharging substantial portions of the blasting media.

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**5,035,090**

## APPARATUS AND METHOD FOR CLEANING STONE AND METAL SURFACES

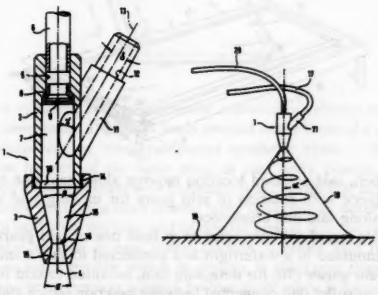
**Johan Sziics, Hornstrasse 9, 8000 München 40, Fed. Rep. of Germany**

**Division of Ser. No. 946,617, Dec. 29, 1986, Pat. No. 4,716,690. This application Jul. 21, 1987, Ser. No. 76,243**

**Claims priority, application European Pat. Off., Aug. 14, 1984, 84109681.1**

**Int. Cl.[5] B24C *5/04***

**U.S. Cl. 51—439** **2 Claims**



1. Apparatus for cleaning stone and metal surfaces, in particular such surfaces contaminated and corroded by atmospheric influences comprising:

a mixing head having a central bore with a longitudinal axis, a forward end, and a rearward end,

means coaxial with said bore at said rearward end for introducing high pressure water,

nozzle means in said bore adjacent said rearward end for substantially vaporizing high pressure water, said nozzle means having a central water entry nozzle coaxial with said axis,

a conically tapering nozzle body coaxially attached to said forward end of said mixing head having a first interiorly conically tapering portion and a second interiorly conically widening portion, and

means for introducing pressurized air entraining blast material into said bore having a central axis extending obliquely forwardly at a first angle less than 90° to said longitudinal axis and offset in a spaced relationship with respect to said longitudinal axis.

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**5,035,091**

## AUTOMATICALLY OPERATED OPENING AND CLOSING ROOF

**Sakae Ebato, Tokorozawa, Japan, assignor to Kabushiki Kaisha Daimon, Saitama, Japan**

**Filed Dec. 12, 1989, Ser. No. 449,546**

**Claims priority, application Japan, Dec. 30, 1988, 63-171478[U]**

**Int. Cl.[5] E04B *7/16***

**U.S. Cl. 52—1** **8 Claims**

1. An automatically operated opening and closing roof, comprising:

a frame (1) having a pair of spaced sidepieces (11,12) which are connected between a pair of spaced crosspieces (13,14) to define a roof area which is completely rimmed by said frame;

a drum (4) mounted for rotation in one of said sidepieces;

a tarpaulin (3) having an area at least corresponding to said roof area, said tarpaulin having one edge mounted to said

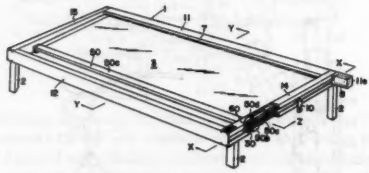
drum for rolling said tarpaulin on said drum with rotation of said drum, and an opposite edge;

a guide rail (60) mounted to and extending along at least one of said crosspieces;

a slider (50) fixed to said opposite edge of said tarpaulin and slidably engaged to said guide rail for movement of said slider and said opposite edge of said tarpaulin away from said drum to cover said roof area and toward said drum to uncover said roof area, with sliding of said slider along said guide rail and rotation of said drum;

a pair of spaced apart gears (20,40) mounted for rotation in one of said crosspieces;

a castellated endless belt (30) engaged around and between said gears for movement of said belt with rotation of said gears, said slider being fixed at a selected location to said



belt, said selected location moving along said one crosspiece with rotation of said gears for moving said slider along said one crosspiece;

drive means (8) connected to at least one of said gears and mounted in a watertight box connected to said frame;

a rain sensor (70) for detecting rain, mounted to said frame;

a controller (90) connected between said rain sensor and said drive means for activating said drive means in a forward and a reverse direction as a result of signals from said rain sensor indicating the presence and absence of rain for respectively covering and uncovering said roof area with said tarpaulin; and

at least said belt, said gears and at least part of said slider being encased within said one crosspiece for protection against rain.

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**5,035,092**

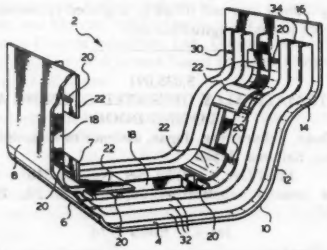
**NONSYMMETRICAL EAVESTROUGH FITTING**

**Anthony W. Brant, Minesing, Canada, assignor to GSW Inc., Barrie, Canada**

**Filed Aug. 13, 1990, Ser. No. 565,969**

**Int. Cl.[5] E04D *13/00*; E02B *5/00***

**U.S. Cl. 52—11** **11 Claims**



1. An eavestrough fitting for a nonsymmetrical eavestrough comprising a generally flat bottom curving upwardly at a rear edge to a generally upright back portion and at a front edge curving upwardly into an angled first section and an upright second section joined to said first section by a curved section, a plurality of sealing ribs following a vertical section of the eavestrough fitting and on the interior surface of the fitting, a plurality of retaining tabs extending over said interior surface of said fitting and defining a slot like opening for receiving an end of a length of eavestrough, said ribs being of a resilient material and cooperating with said tabs to snuggly retain said eavestrough end in a fitting when inserted therein.

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**5,035,093**

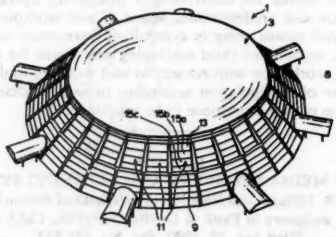
**BUILDING STRUCTURE WITH FIXED CENTER AND MOVABLE PERIMETER ROOF SECTIONS**

**Stephen Parazader, Dundas, and Don F. Carr, St. Catherine, both of Canada, assignors to Blenkhorn and Sawle Limited, St. Catharines, Canada, a part interest**

**Filed Mar. 5, 1990, Ser. No. 488,931**

**Int. Cl.[5] E04B *7/16*; E04H *3/10***

**U.S. Cl. 52—64** **10 Claims**



1. A building structure having a two part multiple angle roof including a first generally horizontal top roof part and a second roof part angled downwardly outwardly from said first roof part, a first roof support under compression between said first and second roof parts and a second roof support under tension below said second roof part, said first roof part spanning said first roof support atop said structure, said second roof part being formed by a pluraltiy of side by side rows of multiple panels with the panels in each row being slideable upwardly and downwardly over one another for opening and closing of said second roof part, the panels in said second roof part, when closed, meeting generally peripherally with said first roof part.

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**5,035,094**

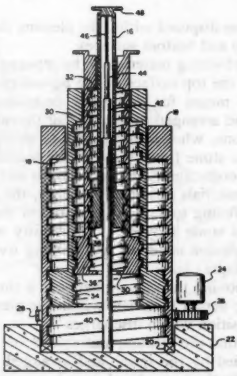
**NESTED EXTENSION/RETRACTION STRUCTURE AND METHOD OF FABRICATION**

**David J. Legare, 11 Bonnie Ave., New Hartford, N.Y. 13413**

**Filed Mar. 26, 1990, Ser. No. 498,624**

**Int. Cl.[5] B66C *5/08, 13/22***

**U.S. Cl. 52—118** **12 Claims**



1. A telescoping, axially extensible and retractable structure comprising:

a) a first, hollow, tube-like member having internal and

external walls and elongated on a central axis between first and second ends;

b) first stop means extending inwardly from said internal wall of said first member adjacent said first end;

c) means defining a first, helical thread on said internal wall of said first member extending substantially from said second end to said first stop means;

d) a second, hollow, tube-like member, positioned at least partially within said first member, having internal and external walls and elongated on said central axis between third and fourth ends;

e) means defining a second, helical thread on said external wall of said second member extending substantially from said fourth end to a predetermined position less than half the distance to said third end, said first and second threads being mutually engaged for relative axial movement of said first and second members in response to relative rotation thereof;

f) second stop means extending inwardly from said external wall of said second member adjacent said predetermined position; and

g) means for effecting relative rotation of said first and second members to produce said relative axial movement thereof between a relatively retracted position, wherein said second and fourth ends are substantially adjacent one another, and a relatively extended position, wherein said first and second stop means are in mutual contact, whereby both said first and second threads remain externally unexposed throughout the range of said relative axial movement of said first and second members.

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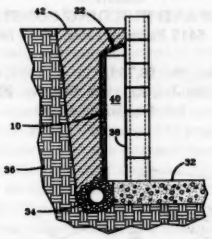
**5,035,095**

## BASEMENT WALL STRUCTURE TO PREVENT WATER LEAKAGE

**Joseph Bevilacqua, 1341 Copley Rd., Akron, Ohio 44320**

**Filed Dec. 15, 1989, Ser. No. 451,296**
**Int. Cl.[5] E02O** *19/12*
**U.S. Cl. 52—169.5** **5 Claims**




1. A system for forming a water tight hollow cavity adjacent to an at least partially subterranean wall of a basement of a building, said cavity sitting atop a footer drain preventing water leakage into the basement, said system comprising:

a unit attached to the outside of the basement wall from the footer to just below the surface ground level, said unit having an opening relationship to the footer drain, but a sealed outer skin to the ground outside the unit, and a water tight sealed relationship to the wall to create a water tight open hollow cavity adjacent the wall and the footer drain;

said unit further having vertically extending structural ridges formed from the sealed outer skin to rest on the wall and support the outer skin; and

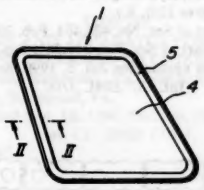
said unit having a closed cap on the outer edge sloped downwardly away from the wall to direct water downwardly and in a water tight sealed relation to the wall and the upper edge of the unit.

**5,035,096**

## SYNTHETIC RESIN WINDOW FOR AUTOMOTIVE VEHICLES OR THE LIKE

**Shinichi Ohtake, and Tatsuya Tamura, both of Yokohama, Japan, assignors to Hashimoto Forming Industry Co., Ltd., Japan**

**Filed Aug. 24, 1990, Ser. No. 572,235**
**Int. Cl.[5] E06B** *3/00*
**U.S. Cl. 52—208** **3 Claims**




1. A synthetic resin window for automotive vehicles or the like, comprising: a window body portion in the form of a sheet of transparent or semi-transparent synthetic resin; a frame portion formed of the same resin as said body portion and molded integrally therewith to extend along peripheral edge of said body portion; a hard coated layer covering an outer surface of said body portion; and an opaque coated layer covering an outer surface of said frame portion, wherein said frame portion has a profile which is greater in thickness than the window body portion, while a hollow inner space is formed in said frame portion to extend continuously in the longitudinal direction of said frame portion.

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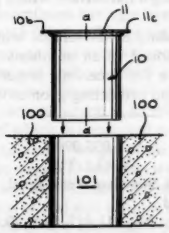
**5,035,097**

## COUPLING FOR CONCRETE WALL OR FLOOR MOUNTING

**Kenneth R. Cornwall, 4963 Springfield Dr., Dunwoody, Ga. 30338**

**Filed Aug. 24, 1987, Ser. No. 88,376**
**Int. Cl.[5] E04B** *5/48*
**U.S. Cl. 52—220** **3 Claims**




1. A building construction which comprises:

(a) an integral plastic coupling for plastic pipe and mounted in a cored or drilled hole in a concrete floor or wall defined by spaced apart planar surfaces which comprises a tube with opposed openings having spaced apart inner and outer cylindrical surfaces around a central longitudinal axis of the tube, wherein the inner surface has a first diameter equal to an outside diameter of standard plastic pipe and wherein the outer surface has a second diameter slightly smaller than a cored or drilled hole in the wall or floor to fit in an interference fit, a flange around one of the openings in the tube secured by an adhesive to one of the spaced apart planar surfaces of the floor or wall as a result of being press fitted into the hole with the adhesive as a

bead at a junction between the outer cylindrical surface of the tube and the flange; and

(b) plastic pipe mounted in the openings of the coupling and solvent welded to the inner surface of the coupling so as to form a continuous conduit with the coupling as part of the conduit.

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**5,035,098**

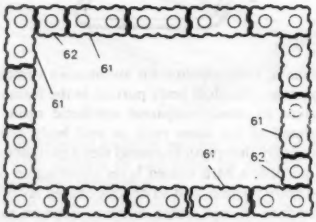
**CONTAINER BLOCK**

**Bob G. Newsom, Etty, Ky., assignor to Advanced Building Technologies, Inc., Olive Hill, Ky.**

**Continuation-in-part of Ser. No. 484,401, Feb. 26, 1990, which is a continuation-in-part of Ser. No. 246,261, Sep. 20, 1988, Pat. No. 4,903,453. This application Jul. 5, 1990, Ser. No. 548,373**

**Int. Cl.[5] E04C *3/00***

**U.S. Cl. 52—589** **41 Claims**




1. A container comprising:

a first side comprising a plurality of parallel offset planes interconnected to form a continuous surface having a first geometric shape;

a second side comprising a plurality of parallel offset planes interconnected to form a continuous surface having a second geometric shape which comprises an interfitting surface to said first geometric shape;

a third side comprising a plurality of parallel offset planes interconnected to form a continuous surface including said first geometric shape;

a fourth side comprising a plurality of parallel offset planes interconnected to form a continuous surface including said second geometric shape;

a fifth side including a flat surface with a projecting geometric shape; and

a sixth side including a flat surface with a recess formed therein dimensioned as an antithesis of said projecting geometric shape for receiving projections dimensioned identically to said projecting geometric shape.

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**5,035,099**

**WALL TIE**

**Ernest B. Lapish, 84 Stamford Park Road, Mt Roskill, Auckland, New Zealand**

**Continuation of Ser. No. 111,417, Oct. 20, 1987, abandoned. This application Sep. 13, 1989, Ser. No. 406,573**

**Claims priority, application Australia, Oct. 31, 1986, 64622/86; Jul. 23, 1987, PI3293**

**Int. Cl.[5] E04B *1/38***

**U.S. Cl. 52—713** **2 Claims**

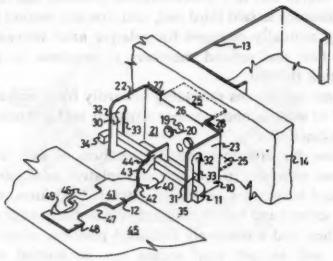
1. A wall tie connector for connecting a first wall structure to a second wall structure including:

a ductile attachment plate having a substantially planar main face and having means for attachment to a first wall structure, said attachment plate having a pair of main flanges protruding from said main face, each flange having an aperture therein;

a ductile elongate member which is a rod having a substantially square cross-section and having a length and breadth and height, said ductile elongate member being secured to said attachment plate by passing through said apertures in said main flanges;

a retaining member having means adjacent a first end thereof for attachment to a second wall structure, said retaining member having an aperture adjacent a second end thereof through which the ductile elongate member passes to connect said retaining member to the attachment plate;

the ductile elongate member having surfaces along at least part of the length thereof in contact with complementary surfaces bounding at least one of said flange apertures, said surfaces being so shaped as to prevent rotation of the elongate member about a longitudinal axis thereof relative to said flanges;




said retaining member aperture being closely coupled to said elongate member in an axial direction of the retaining member and forming a sliding fit thereon so as to allow the retaining member to slide from side to side along the elongate member;

at least one of said flange apertures comprising an elongated slot which is substantially perpendicular both to the axial direction of the retaining member and to the length of the elongate member, thereby to allow relative movement between said retaining member and said attachment plate in a direction parallel to said slot.

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**5,035,100**

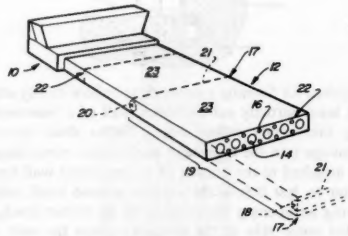
**WALL SLAB AND BUILDING CONSTRUCTION**

**Melvin H. Sachs, 5415 Fairway Lane, West Bloomfield, Mich. 48033**

**Continuation of Ser. No. 18,763, Mar. 2, 1987, abandoned. This application Jul. 22, 1988, Ser. No. 223,156**

**Int. Cl.[5] B29C *47/00***

**U.S. Cl. 52—741** **11 Claims**




1. A method of forming a plurality of building slabs comprising:

forming a longitudinally elongated flat continuous slab having upper and lower flat faces and side edges and having a width as measured between said side edges substantially exceeding its height as measured between said upper and lower faces;

forming a plurality of longitudinally extending core passages in said slab;

cutting said continuous slab transversely from side edge to

side edge thereof at locations spaced longitudinally therealong to form a plurality of individual flat slab sections each having side edges, upper and lower faces, end faces, and longitudinally extending core passages; and

forming a transverse groove in one end face of each slab section extending from side edge to side edge of the slab between said upper and lower faced opening in said side edges and in said one end face, and intersecting said longitudinally extending core passages.

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**5,035,101**

## PACKAGING MACHINE

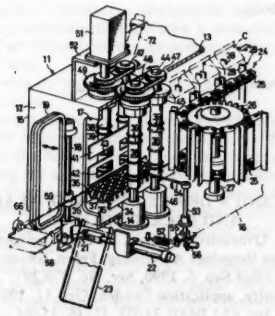
**Shigeru Wakabayashi, and Masao Shimokawa, both of Tokushima, Japan, assignors to Shikoku Kakoki Co., Ltd., Tokushima, Japan**

**Filed Oct. 12, 1990, Ser. No. 596,823**

**Claims priority, application Japan, Oct. 31, 1989, 1-128362[U]**

**Int. Cl.[5] B65B 57/08**

**U.S. Cl. 53—53** **7 Claims**



1. A packaging comprising:

a closed aseptic chamber having a required packaging work space as separated from the outside air and a front wall formed with a container outlet,

a closure pivotally movably attached to the outer side of the front wall at an edge portion of the container outlet,

an inner container conveyor disposed inside the chamber to provide an inner path of transport of containers, the inner transport path having a terminal end positioned to the rear of the container outlet at a distance therefrom,

an outer container conveyor disposed outside the chamber to provide an outer path of transport of containers, the outer transport path having a starting end positioned in front of the container outlet at a distance therefrom,

a fixed transfer member interposed between the container outlet and the terminal end of the inner transport path and having a rear end connected to the terminal end of the inner transport path,

a movable transfer member interposed between the container outlet and the starting end of the outer transport path and movable about its front end upward to a raised position or downward to a horizontal position, the movable transfer member being connected at its front end to the starting end of the outer transport path and at its rear end to the front end of the fixed transfer member when in the horizontal position, the movable transfer member having its front end held connected to the starting end of the outer transport path and its rear end disconnected from the front end of the fixed transfer member when moved to the raised position,

means for successively forwarding containers on the fixed transfer member from its rear end to the front end thereof and then delivering the containers from the front end to the rear end of the movable transfer member in the horizontal position, and

means for moving the movable transfer member between the horizontal position and the raised position so as to bring the movable transfer member to the raised position, thereby rendering the movable transfer member free of interference with the closure and permitting the containers on the movable transfer member to slide down onto the starting end of the outer transport path under gravity.

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**5,035,102**

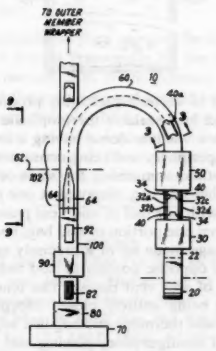
## METHODS AND APPARATUS FOR APPLYING C-SHAPED INNERFRAMES TO CIGARETTE BUNDLES

**John Tomanovits, Richmond, Va., assignor to Phillip Morris Incorporated, Richmond, Va.**

**Filed Sep. 19, 1990, Ser. No. 584,803**

**Int. Cl.[5] B56B 11/08**

**U.S. Cl. 53—397** **11 Claims**




1. Apparatus for wrapping a cigarette pack innerframe around a previously assembled bundle of cigarettes, said bundle having a front surface, a rear surface substantially parallel to and spaced from said front surface, and a pair of side surfaces which are substantially parallel to and spaced from one another and which interconnect side margins of said front and rear surfaces, said innerframe having a front wall which is to at least partly cover said front surface, a pair of side walls, each of which is to at least partly cover a respective associated one of said side surfaces and each of which is connected to a respective one of opposite side margins of said front wall, and a pair of rear flaps each of which is to partly cover said rear surface and each of which is connected to a respective one of said side walls along a side margin of said side wall which is spaced from the side margin of the front wall to which that side wall is connected, said innerframe being prebent separate from said bundle at all four of said side margins of said innerframe so that the cross section of said innerframe perpendicular to said innerframe side margins is approximately C-shaped, said apparatus comprising:

means for supporting said bundle so that the front and side surfaces of said bundle are exposed;

means for holding said prebent innerframe open so that the edges of said rear flaps which are parallel to but spaced from said side margins are spaced apart by a distance greater than the spacing between said side surfaces;

means for placing said prebent but held open innerframe on said bundle so that each of said rear flaps can pass outside of a respective one of said side surfaces in order to project behind said rear surface, and so that said front wall rests on said front surface;

means for moving said bundle and said innerframe together in a predetermined direction along a longitudinal axis

which is substantially parallel to said side margins of said front and rear surfaces; and

means for guiding said rear flaps forward one another and into contact with said rear surface as said bundle and said innerframe move along said longitudinal axis to at least partly cover said rear surface inserted.

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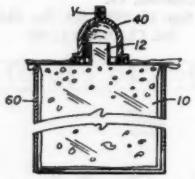
**5,035,103**

## SELF SEALING VACUUM VENT AND DOME PROCESS

**Walter I. Akkala, 638 Sycamore Sq., Lady Lake, Fla. 32159**

**Filed Jun. 4, 1990, Ser. No. 532,390**
**Int. Cl.[5] B65B *31/00***
**U.S. Cl. 53—434** **9 Claims**




1. The method of vacuum packaging products involving a substantially filled heat sealable thermoplastic bag utilized in conjunction with a vacuum dome having a sealing edge disposed around its periphery and being connected to a source of vacuum, said method comprising the steps of forming a flat vent passage within said bag, disposed at one peripheral location on said bag with one half of said vent passage being made up of material from one portion of said bag, and the other half of said vent passage made up of a precisely equal amount of material from an opposite portion of said bag, such that the interior surfaces of said vent passage can tend to adhere together, said bag being entirely closed except for said vent passage, placing said thermoplastic bag in a supportive device having a desired configuration, placing said vacuum dome over said vent passage so said vent passage protrudes into the interior of said vacuum dome, with the peripheral edge of said dome in contact with bag portions surrounding said vent passage, reducing the pressure inside said dome, so as to cause the egress of air from the interior of said bag out through said vent passage, thereafter removing the source of vacuum from said come, and then removing said dome from contact with said bag, with the sidewalls of said vent member sealing together temporarily without letting the air back in, as a result of such precisely equal amounts of material, and then taking the final step of heat sealing the opening of said vent passage together, to effectively prevent the return of air to the interior of said bag.

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**5,035,104**

## METHOD OF PACKAGING EASILY DAMAGED ARTICLES

**Robert W. Helling, 11214 Quivas Way, Westminster, Colo. 80234; Daniel J. Helling, 8288 Pecos St., Denver, Colo. 80221, and Dean V. Rogers, 9330 N. County Rd. 15, Fort Collins, Colo. 80524**

**Filed Jul. 9, 1990, Ser. No. 550,099**
**Int. Cl.[5] B65B *23/00, 55/20, 53/00***
**U.S. Cl. 53—441** **9 Claims**

1. In a method of packaging an article comprising the steps of:

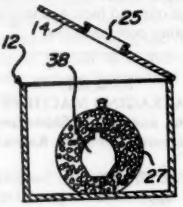
expanding an expandable and contractible body having a fill opening by inflating said body with a gas,

placing an initial preselected quantity of packaging particles inside said expanded body,

placing an article inside said expanded body on said particles,

placing a further selected quantity of packaging particles inside said expanded body sufficient to entirely surround said article with a layer of particles when the body is collapsed about said layer of particles and article, and

contracting said expanded body around said particles and article to form a layer of particles surrounding said article on all sides by releasing said inflating gas to collapse said




body to apply substantially uniform compressive forces to compress said particles against said article and cause a frictional energization of particles against said article and against one another to cushion said article in said contracted body.

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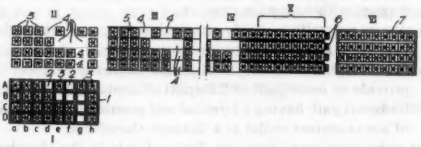
**5,035,105**

## METHOD AND A DEVICE DESIGNED TO ARRANGE AND PACK SEEDLINGS

**Bengt G. L. Qvarnström, Falun, Sweden, assignor to Stora Kopparbergs Bergslags Aktiebolag, Falun, Sweden**

**Filed Sep. 6, 1990, Ser. No. 578,297**
**Claims priority, application Sweden, Oct. 11, 1989, 8903344**
**Int. Cl.[5] B65B *25/02, 35/36, 35/44***
**U.S. Cl. 53—448** **16 Claims**



1. A method for arranging and packing plants including their root lumps, said plants having been grown in a seedling unit containing a large number of plants and soil lumps arranged in a plurality of rows and lines adjacent each other in a uniform rectilinear check pattern, wherein some of said soil lumps may be void of any plant or may contain only a badly developed plant due to failed seed germination, reduced growth or other circumstances, said method comprising the steps of:

removing any of said void soil lumps and soil lumps containing only badly developed plants from said seedling unit;

gripping the remaining healthy plants;

placing said gripped healthy plants in channels in the same pattern they had with respect to each other in said seedling unit, with a separate channel for every row;

conveying said plants in said channels from an input end to an output end;

eliminating gaps between said plants in said channels not later than at said output end;

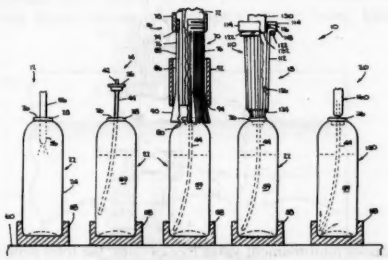
removing from said channels a certain number of plants so collected, the number removed corresponding to a certain length of said channels at said output end; and

placing said removed plants in a transport container.

## 5,035,106
## METHOD OF SEALING A VALVE TO AN AEROSOL CONTAINER

Franklin D. Haase, Ridge Farm, Ill., assignor to CCL Industries, Willowdale, Canada

Filed Dec. 12, 1989, Ser. No. 449,525
Int. Cl.[5] B65B *3/02, 31/04*
U.S. Cl. 53—470 7 Claims



1. A method of obtaining a substantially leak tight seal between a valve assembly that includes a mounting cup and a container of an aerosol having an opening with a peripheral bead, comprising

(a) preforming the mounting cup with a peripheral bent over flange portion,

(b) disposing the mounting cup onto a container at an opening in the container such that the bent over flange is disposed on the bead that surrounds the container opening,

(c) matching the mounting cup with the container bead such that the bent over peripheral flange is alongside a radially outer portion of the bead and extends axially a predetermined amount to permit tucking of the bent over flange under the bead,

(d) applying a clinching force to a circumferential section of the bent over flange portion alongside the radially outer portion of the bead to tuck the bent over flange portion under the bead and thereby permanently anchor the mounting cup onto the bead, and

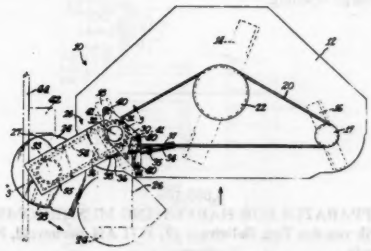
(e) crimping a peripheral wall portion of the mounting cup against a radially inner surface portion of the bead to permanently lock the crimped peripheral wall portion against the radially inner surface of the bead such that the combination of the clinching and the crimping of the mounting cup operates to urge the bent over flange, intermediate the clinched and crimped portions, toward the peripheral bead, the combination of the crimping and the clinching of the mounting cup also operating to stabilize the bent over flange from receding from the bead to provide a substantially stable permanent joint between the valve assembly and the container.

## 5,035,107
## LAWN MOWER WITH TRIMMING ATTACHMENT

Joseph H. Scarborough, 551 Hilltop Rd., Elkton, Md. 21921

Filed May 29, 1990, Ser. No. 529,612
Int. Cl.[5] A01D *34/66, 34/82, 34/83*
U.S. Cl. 56—10.4 16 Claims

1. Rotary lawn mower apparatus comprising a primary mower housing, an engine for driving at least one primary grass cutting blade in said primary housing and having a powered trimming attachment assembly rotatably mounted on said primary mower housing by means of a swing arm assembly, wherein said trimming attachment assembly includes an auxiliary trimming blade mounted in a housing attached to said swing arm assembly, the trimming attachment assembly being rotatably movable from a forward position extending laterally and outwardly from the primary mower housing such that the trimming blade path slightly overlaps the mowed path of the primary blade, to a rearward position located substantially behind and within the mowed path of the primary mower, said primary housing having affixed thereto an actuator assembly which extends to and is affixed to said swing arm assembly, said actuator assembly comprising means tending to force said swing arm assembly to its said forward position, wherein said auxiliary trimming blade is driven by belt means taking power from said engine such that, when an obstruction such as a fence post or the like is encountered by the trimming attachment

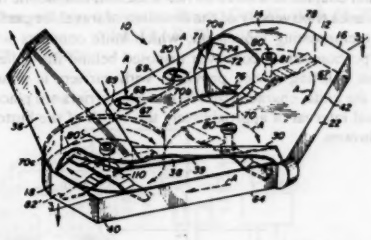


assembly, adjacent said primary mower, the trimming attachment assembly is forced rearwardly by the obstruction and swings into the mowed path of the primary mower, during which movement the grass near and around said obstruction is cut by said auxiliary trimming blade, and, as said obstruction is passed, said actuator assembly forces the trimming attachment assembly back into its original forward auxiliary cutting position until another obstacle is encountered.

## 5,035,108
## MOWER DECK DEDICATED TO GRASS COLLECTION

Allen D. Meyer, and John E. Hicks, both of Lincoln, Nebr., assignors to Cushman Inc., Lincoln, Nebr.

Filed May 29, 1990, Ser. No. 530,021
Int. Cl.[5] A01D *34/66, 87/10*
U.S. Cl. 56—13.4 14 Claims



1. A mower deck adapted to be propelled along the ground, comprising:

a shroud having a top, a first side, a second side, a depending peripheral skirt defining an open bottom, a discharge opening being associated with said second side and baffle means being configured to separate an air intake interior area located on one side of said baffle means and a cutting chamber located on the other side of said baffle means, said air intake region having an intake port in said shroud and on said one side of said baffle means;

cutter means located within said shroud and including at least two rotary cutter blades, each said blade mounted on a corresponding vertical drive shaft, one of said drive shafts being located adjacent to said discharge opening, said blades rotating axially in the same direction and forming a cutting path extending from said first side to said second side, each said blade adapted to cut plants within a portion of said path and to advance the clippings gener-

ated thereby downstream to the blade disposed next adjacent thereto and toward said second side; and

said drive shaft disposed adjacent to said discharge opening being provided with an impeller blade being coaxial with, and oriented at an angle to, said respective cutter blade to draw the flow of plant clippings from said open bottom and generally from said first side to said second side of said shroud and to transmit said clippings through said discharge opening.

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**5,035,109**

## APPARATUS FOR HARVESTING MUSHROOMS

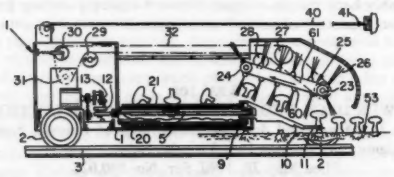
**Hendrik van den Top, Bellstraat 19, 3771 AH Barneveld, Netherlands**

**Filed Oct. 2, 1990, Ser. No. 591,718**

**Claims priority, application Netherlands, Oct. 5, 1989, 8902483**

**Int. Cl.[5] A01D** *45/00*

**U.S. Cl. 56—327.1** **3 Claims**



1. Apparatus for harvesting mushrooms cultivated on a bed, wherein a knife having a virtually horizontally oriented cutting edge and coupled to a drive device is located in a mobile frame and extends transversely of the direction of travel for performing a reciprocating movement, which knife connects with a rising portion onto a conveyor disposed behind the knife and wherein a lifting device provided with carriers is mounted above the knife, characterized in that the carriers are placed at a mutual interval of approximately the width of the button of a mushroom.

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**5,035,110**

## NUB YARN

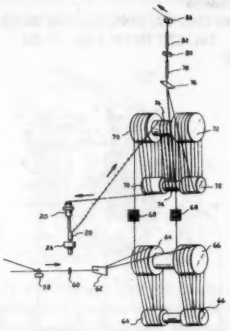
**Thomas L. Nelson, Georgetown, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation of Ser. No. 360,045, Jun. 1, 1989, abandoned, which is a division of Ser. No. 236,766, Aug. 26, 1988, Pat. No. 4,870,728, which is a division of Ser. No. 46,090, May 5, 1987, Pat. No. 4,809,412, Division of Ser. No. 804,408, Dec. 4, 1985, Pat. No. 4,697,317. This application Oct. 31, 1990, Ser. No. 607,204**

**Int. Cl.[5] D02G** *1/16*

**U.S. Cl. 57—208** **3 Claims**

1. A novelty yarn suitable for use in carpet applications comprised of a substantially twist free, crimped, continuous multifilament nub yarn having randomly-spaced, tightly entangled nubs less than one inch in length, said nub yarn being cointerlaced with one to four substantially twist free, crimped



continuous multifilament yarns free of nubs, the total denier of the novelty yarn being from 1000–5000.

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**5,035,111**

## COMBINATIONS OF POLYMER FILAMENTS OR YARNS HAVING A LOW COEFFICIENT OF FRICTION AND FILAMENTS OR YARNS HAVING A HIGH COEFFICIENT OF FRICTION, AND USE THEREOF

**Eric H. M. Hogenboom, and Peter Bruinink, both of Maastricht, Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands**

**Filed Sep. 30, 1988, Ser. No. 251,455**

**Claims priority, application Fed. Rep. of Germany, Oct. 2, 1987, 3733427**

**Int. Cl.[5] D02G** *3/04, 3/38;* **D01H** *4/00*

**U.S. Cl. 57—224** **22 Claims**

1. A filament or yarn having utility in production of bullet-proof articles comprising a first fiber consisting essentially of at least one of a polyolefin and a polyvinyl alcohol, core spun or twisted with a second fiber having a higher coefficient of friction than said first fiber and consisting essentially of at least one of cotton, an elastomer, a polyacrylate, a polymethacrylate, and a polyurethane,

wherein said first fiber has a higher tensile strength and a higher modulus than said second fiber and,

wherein the proportion of said second fiber is a minor amount by weight.

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**5,035,112**

## NON-CONTINUOUS IGNITION TRAIN

**John M. McGarry; Howard S. Dilts, both of San Jose, and Nils O. Langenborg, Sunnyvale, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Dec. 3, 1982, Ser. No. 446,833**

**Int. Cl.[5] F02K** *7/18, 9/95*

**U.S. Cl. 60—39.823** **8 Claims**

1. A rocket-ramjet nozzle device attached to a motor pressure vessel, operating initially as a rocket and subsequently as a ramjet, comprising:

a secondary nozzle attached to said vessel for directing a flow of exhaust gases during ramjet operation;

a primary nozzle mounted within said secondary nozzle defining an air gap mounted therebetween, said primary nozzle for directing a flow of exhaust gases during rocket operation;

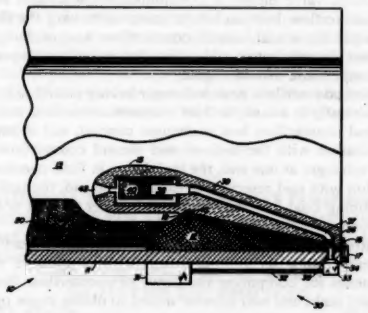
means for ejecting said primary nozzle from said secondary nozzle;

safe-arming means; and

a pyrotechnic igniter, located between said safe-arming

means and said primary nozzle, composed of a squib which detonates upon a command signal, a donor device located within a a wall of said secondary nozzle;

a first pyrotechnic ignition lead penetrating said secondary nozzle wall for carrying a pyrotechnic impulse from said squib to said donor device, said donor device being capable of initiating a pyrotechnic impulse jumping said air gap, a receptor charge capable of initiating a pyrotechnic impulse upon receiving said pyrotechnic impulse from said donor device said receptor charge being located



within a wall of said primary nozzle, a pressure sealing initiator capable of initiating a pyrotechnic impulse upon receipt of an impulse from said receptor, charge, a second pyrotechnic ignition lead penetrating said primary nozzle wall for carrying said pyrotechnic impulse from said receptor charge to said pressure sealing initiator, and a rocket motor igniter, said rocket motor igniter being capable of igniting rocket propellant within said motor pressure vessel upon receiving a pyrotechnic impulse from said pressure sealing initiator.

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**5,035,113**

**ELECTROPNEUMATIC REMOTE CONTROL FOR SHIFTING THE MECHANICAL TRANSMISSION OF A MOTOR VEHICLE**

**Sándor Simonyi, Salgótarján; László Töröcsik, Budapest; István Tóth, and György Válóczi, both of Salgótarján, all of Hungary, assignors to Csepel Autógyár, Szigetszentmiklos, Hungary**

**Continuation-in-part of Ser. No. 196,377, May 19, 1988, abandoned. This application Jan. 13, 1989, Ser. No. 297,669**

**Int. Cl.[5] F16H** *61/24, 59/10;* **F15B** *15/26;* **F01B** *7/04*

**U.S. Cl. 60—390** **11 Claims**

9. A shift lever mechanism for a remote vehicle shifting system which comprises,

(a) a shift lever pivotally mounted for movement in a path-selecting direction into selective alignment with a plurality of shifting paths and for movement in a shifting direction along any of said shifting paths into and out of shift positions,

(b) a braking member associated with said shift lever and movable with said lever in its movements in the shifting directions,

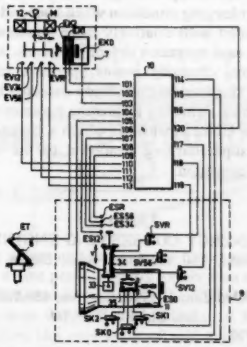
(c) controllably operable brake means associated with said braking member for controllably restraining said braking member and said shift lever against free movement in a shifting direction,

(d) said brake means being actuated during movements of said shift lever along a shift path toward a shift position, to temporarily restrain said shift lever whereby further movement of said lever is effected against increased resistance emulating the resistance of mechanically engaging gears of a direct-shifted mechanical transmission,

(e) a shift cylinder associated with said shift lever mechanism,

(f) means for operating said cylinder with higher and lower levels of force,

(g) first control means for operating said cylinder with lower levels of force during initial movements of said shift lever



toward a shift position, for effecting synchronization of gears, and

(h) second control means for operating said cylinder with higher levels of force during further movements of said shift lever, against the resistance of said brake means, toward said shift position.

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**5,035,114**

**AIR SUPPLY CONTROL SYSTEMS FOR TURBOCHARGED INTERNAL COMBUSTION ENGINES**

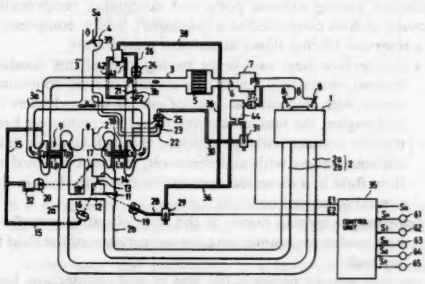
**Masanori Shibata; Masaru Yamamoto; Haruo Okimoto, and Seiji Tashima, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan**

**Filed Oct. 25, 1989, Ser. No. 426,586**

**Claims priority, application Japan, Oct. 27, 1988, 63-272525**

**Int. Cl.[5] F02B** *37/00*

**U.S. Cl. 60—612** **15 Claims**



6. An air supply control system for an internal combustion engine comprising:

first and second superchargers operative to be selectively situated in a first supercharging condition wherein only the first supercharger works for supercharging the engine and in a second supercharging condition wherein both the first and second superchargers work simultaneously for supercharging the engine,

operation detecting means for detecting parameters representative of intake air flow fed into the engine,

traveling condition detecting means for detecting traveling conditions of a vehicle equipped with the engine, said

traveling conditions causing a change in output of the engine,

supercharging operation control means operative to cause said first and second superchargers to be situated in said first supercharging condition when a first engine operation attended with relatively small intake air flow is detected by said operation detecting means and to cause said first and second superchargers to be situated in said second supercharging condition when a second engine operation attended with relatively large intake air flow is detected by said operation detecting means, and

operating area changing means operative to vary, in response to the traveling condition detected by said traveling condition detecting means the parameters representative of the intake air flow at which a change occurs from the first supercharging condition to the second supercharging condition.

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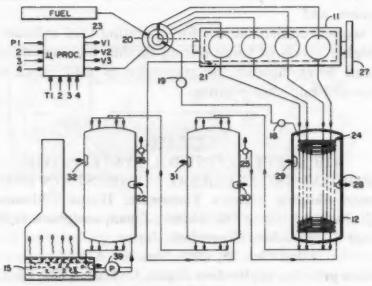
**5,035,115**

## ENERGY CONSERVING ENGINE

**Stanley Ptasinski, 160 Holdman Ave., Sierra Madre, Calif. 91024**

**Filed Jan. 2, 1990, Ser. No. 459,989**
**Int. Cl.[5] F01B *29/04***
**U.S. Cl. 60—712** **7 Claims**




1. An Otto cycle engine utilizing fossil fuels, having a coolant waterjacket surrounding a plurality of internal combustion cylinders having exhaust ports and containing reciprocally moving pistons connected to a crankshaft, which comprises:

a reservoir storing liquid at ambient temperature;

a counterflow heat exchanger having at least one conduit located centrally in a tank, the conduit in fluid communication with said exhaust port of one of said cylinders of said engine, the tank containing liquid in conductive heat transfer contact with the conduit, the tank being in fluid communication with said reservoir, the tank adapted to flow fluid in a direction opposite to the fluid flow in the centrally located conduit;

temperature sensing means in the tank of said counterflow heat exchanger, monitoring the temperature of the fluid in the tank;

pressure sensing means in the tank of said counterflow heat exchanger, monitoring the pressure in the tank;

a first valve means in fluid communication with the tank adapted to vary the flow rate of fluid in the tank;

a second counterflow heat exchanger having a conduit located centrally in a tank, said conduit in fluid communication with at least one of said plurality of cylinders of said engine, and said tank containing fluid in conductive heat transfer contact with said conduit, said tank in fluid communication with said reservoir.

temperature sensing means in the tank of said second counterflow heat exchanger, monitoring the temperature of fluid in said tank;

pressure sensing means in the tank of said second counterflow heat exchanger, monitoring the pressure in the tank;

a second valve means in communication with the tank in said heat exchanger, adapted to adjust flow rate of fluid in the tank;

a third valve means in communication with the tank of said first counterflow heat exchanger, adapted to initiate and terminate the flow of superheated water from said first counterflow heat exchanger tank, to said engine;

injector means in at least one of said cylinders of said engine, adapted to inject superheated water from said third valve means into said cylinder;

a fourth valve means in communication with said second counterflow heat exchanger, adapted to vary the flow of water from said second counterflow heat exchanger to said waterjacket of said engine for maintaining operating temperature of said engine;

a third counterflow heat exchanger having a conduit located centrally in a tank, in fluid communication with said second counterflow heat exchanger conduit, and in communication with the tank of said second counterflow heat exchanger at one end, the tank being in fluid communication with said reservoir at the opposite end, the tank containing fluid in conductive heat transfer contact with the conduit;

controller means connected to said four valve means, said temperature sensor means and to said pressure sensor means for computing the flows of counterflow fluids in said tanks and said injector means to obtain steam operating mode temperatures;

whereby the superheated water temperature and pressure conditions in the plurality of counterflow heat exchangers is used to compute the amount of flow through the valves for producing superheated water for injection into the cylinders to initiate steam mode operation from fossil fuel mode and return, whenever the proper temperature and pressure conditions exist for mode conversion.

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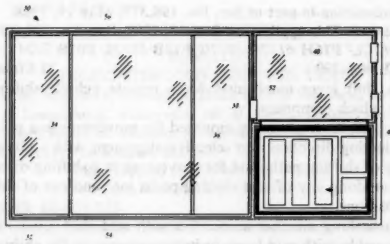
**5,035,116**

## APPARATUS TO ADAPT A WINDOW AIR CONDITIONING UNIT TO A SLIDING GLASS WINDOW SILL

**Richard B. Main, Fremont, Calif., assignor to Silicon Joule Corporation, Wilmington, Del.**

**Filed Oct. 9, 1990, Ser. No. 594,557**
**Int. Cl.[5] F25D *23/12***
**U.S. Cl. 62—77** **4 Claims**



1. An adaptor system for installing a window air conditioning (AC) unit, said AC unit being mounted in a window case having a fixed window pane and a horizontally sliding window pane comprising a frame made of an extruded metal stock, said frame fastened around a pane of glass, said frame constructed such that various sizes of sliding window panes can be custom made easily by cutting said extruded metal to length and reassembling around said pane of glass, said sliding window pane having latching means to secure said sliding window pane in a closed position to one side of said window case, comprising:

a horizontally sliding adaptor pane comprising a frame as-

sembled of an extruded metal stock, said frame fastened around a pane of glass, said frame constructed such that various sizes of sliding window panes can be custom made by cutting said extruded metal to length, said sliding adaptor pane having latching means to secure said adaptor pane in a closed position to the same side of said window case intended to receive said sliding window pane, the adaptor pane having means to mate with the latching means of the sliding window pane, the adaptor pane having a horizontal dimension substantially the same as the width of the AC unit and having a vertical dimension substantially the height of the window case less the height of the AC unit; and

means to guide the bottom of the adaptor pane in a horizontal sliding operation from side to side, the guiding means capable of being fastened to the top of the AC unit such that it parallels an equivalent channel at the top inside edge of the window case and such that the adaptor plane may slide in a manner that mimics the sliding window pane.

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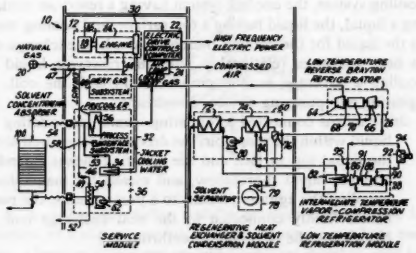
**5,035,117**

## THERMAL ENGINE DRIVEN HEAT PUMP FOR RECOVERY OF VOLATILE ORGANIC COMPOUNDS

**Richard L. Drake, Schenectady, N.Y., assignor to Mechanical Technology Incorporated, Latham, N.Y.**

**Filed Aug. 1, 1990, Ser. No. 561,458**
**Int. Cl.[5] F25B *7/00*; B01D *51/00***
**U.S. Cl. 62—79** **20 Claims**




1. An apparatus for separating volatile organic compounds from a stream of gas, including:

an internal combustion engine including a rotating shaft;

an inert gas generating means for converting at least a portion of exhaust from said internal combustion engine into an inert gas and mixing said inert gas into said stream of gas;

heat transfer means for recovering waste heat from said internal combustion engine to heat a portion of said stream of gas;

a first and a second refrigeration system operatively connected to said rotating shaft of said internal combustion engine, said first and said second refrigeration systems operating at substantially different temperatures, said first and second refrigeration systems receiving said stream of gas and cooling said stream of gas thereby extracting the volatile organic compounds therefrom.

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**5,035,118**

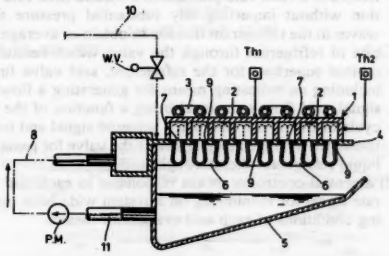
## AUTOMATIC ICE MAKING MACHINE

**Yasuo Hara, Toyoake, Japan, assignor to Hoshizaki Denki Kabushiki Kaisha, Aichi, Japan**

**Filed Apr. 16, 1990, Ser. No. 510,036**
**Int. Cl.[5] F25C *1/12***
**U.S. Cl. 62—126** **4 Claims**

1. An automatic ice making machine having an ice making section equipped with an evaporator connected to a freezing system, a water feed system for feeding a water to be frozen to said ice making section, an ice formation detector which detects completion of forming ice cakes in said ice making section, and an ice releasing unit which releases the ice cakes formed in the ice making section upon receipt of ice formation signal from said ice formation detector;

characterized in that said ice making machine further comprises an alarm unit including a timer, said timer being preset to a time period slightly longer than a time required for normal ice making operation, and if said ice formation detector does not detect completion of forming of ice cakes before the expiration of said time period in said timer, said alarm unit generates an alarm.

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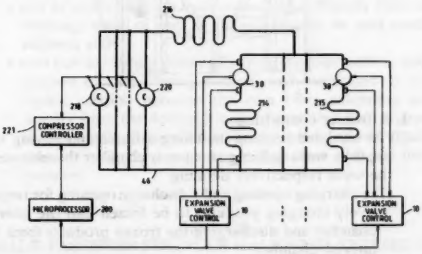
**5,035,119**

## APPARATUS FOR MONITORING SOLENOID EXPANSION VALVE FLOW RATES

**Richard H. Alsenz, 1545 Industrial Rd., Missouri City, Tex. 77489**

**Continuation-in-part of Ser. No. 639,271, Aug. 8, 1984, Pat. No. 4,651,535. This application Jun. 30, 1986, Ser. No. 880,677**
**The portion of the term of this patent subsequent to Mar. 24, 2004, has been disclaimed.**
**Int. Cl.[5] F25B *41/04, 49/00***
**U.S. Cl. 62—225** **23 Claims**




1. A refrigeration system having in a closed loop connection:

(a) a compressor means having an inlet and an outlet end;

(b) a condenser means connected to the outlet end of said compressor and responsive to a high pressure gaseous phase recirculating refrigerant for condensing the refrigerant from its gaseous to its liquid phase;

(c) a plurality of evaporator means, each having an inlet and an outlet end and connected to said condenser means and to inlet end of said compressor;

(d) each said evaporator means having an associated solenoid expansion valve having an inlet and an outlet end connected between the outlet end of said condenser and the inlet end of said associated evaporator, said condenser delivering high pressure liquid refrigerant to the inlet end of said expansion valves, said refrigerant expanding as it flows through said expansion valves;

(e) each said solenoid expansion valve including an associ-

ated on-off modulator responsive to the superheat of said refrigerant in said associated evaporator for generating a variable duty cycle on-off modulated solenoid control signal said solenoid control signal, alternately energizing and deenergizing said associated solenoid each cycle of said solenoid control signal to slowly cycle said valve from a first flow rate position to a second flow rate position without imparting any substantial pressure shock waves to the refrigerant thereby to obtain an average flow rate of refrigerant through the valve which results in a desired superheat for the refrigerant, said valve further including an indicating means for generating a flow rate signal, said flow rate signal being a function of the duty cycle of the on-off modulated solenoid signal and indicative of the average opening size of the valve for passage of liquid refrigerant therethrough; and

(f) a central controller means responsive to each said flow rate signal for monitoring on a system wide basis operating conditions of each said evaporator means.

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**5,035,120**

**FREEZER**

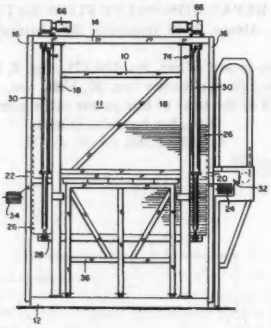
**Guy Quilliou, Niort, France, assignor to Pierre Guerin S.A., Mauze-sur-le-Mignon, France**

**Filed May 11, 1990, Ser. No. 522,546**

**Claims priority, application France, May 22, 1989, 89 06640**

**Int. Cl.[5] F25C *5/14***

**U.S. Cl. 62—341** **7 Claims**



1. A freezer comprising

(a) an insulated housing including a frame and having two opposite walls defining an interior chamber therebetween, the walls respectively defining

(1) a charging opening and a discharge opening for respectively charging products to be frozen into the interior chamber and discharging the frozen products from the interior chamber,

(b) a stack of horizontal freezer plates arranged in the interior chamber, and

(c) vertical screw jack means for vertically displacing the stack of freezer plates whereby said freezer plates are successively moved to the level of the openings, each screw jack of said means comprising

(1) a screw element,

(2) a nut engaging the screw element,

(3) a tube element having two ends, the tube element concentrically surrounding the screw element, the nut being affixed to one of the tube element ends and the opposite tube element end being closed, and one of the screw jack elements being pendularly suspended from the freezer housing frame while the stack of freezer plates is suspended on the other screw jack element, and

(4) a tubular casing having a bottom, the tubular casing concentrically surrounding the tube element and the tube element passing fluid-tightly through the tubular casing bottom, the interiors of the tube element and of the tubular casing being in communication with each other to define an oil-filled closed space of a predetermined volume,

(c) a closed expansion reservoir of air connected to an upper part of the closed space, and

(d) a motor coupled to the one screw jack element for rotating the one screw jack element.

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**5,035,121**

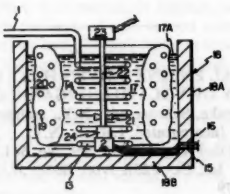
**BEVERAGE COOLING AND PUMPING SYSTEM**

**Christopher M. Cook, Eastbourne, England, assignor to IMI Cornelius Inc., Anoka, Minn.**

**Filed Jul. 25, 1990, Ser. No. 557,879**

**Int. Cl.[5] B67D *5/62***

**U.S. Cl. 62—389** **26 Claims**



1. An agitating and pumping device for use in a beverage cooling system, the cooling system having a reservoir containing a liquid, the liquid having a top surface, and cooling means in the liquid for the cooling thereof, and a heat exchange coil in heat exchange relationship with the reservoir liquid for cooling a beverage as it is circulated through the coil, the agitating and pumping device, comprising:

drive means connected to agitating means for agitating the liquid within the reservoir, the drive means secured above the liquid top surface and the agitating means extending into the liquid therebelow, and means for magnetically coupling the agitating means to a pump means, the pump means fluidly connected to the heat exchange coil for circulating the beverage therethrough.

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**5,035,122**

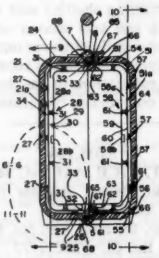
**PORTABLE CONTAINERS FOR MAINTAINING FOOD STUFFS IN A CHILLED CONDITION**

**Harry W. Oogjen, 409-301 Harbour Point Dr., Virginia Beach, Va. 23451**

**Filed Mar. 27, 1990, Ser. No. 499,642**

**Int. Cl.[5] F25D *3/08***

**U.S. Cl. 62—457.2** **7 Claims**



1. A portable container for maintaining food stuffs at a temperature sufficiently low enough to prevent expotential growth of bacteria comprising: two partible exterior casings with means to secure them together, means to seal said casings

when joined together against entrance of ambient temperature and dissipation of said joined together casing interior temperature and means on the exterior of one of said casings to carry said container; each of said casings having an inner double-well shell positioned within each said casing in a spaced relationship with each said casing interior surface by means of a plurality of protrusions extending inwardly from each said interior surface, each said shell being adhered to its respective protrusions to form a closed, air tight chamber between said inner surface and said shell as a barrier against transmission of heat exterior to said casing to said shell; each of said shells between a gel-like substance having one property of becoming a solid when subjected to low temperature and and another property of minimal expansion when in a solid state.

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**5,035,123**

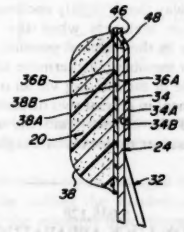
## EARRING CUSHION AND METHOD OF MAKING SAME

**Robert A. Kogen, 905 Exeter Crest, Villanova, Pa. 19085**

**Filed Mar. 7, 1990, Ser. No. 490,105**

**Int. Cl.[5] A44C *7/00***

**U.S. Cl. 63—14.3** **16 Claims**




1. A cushioned earring pad for releasable securement to a portion of a clip-on earring, said pad comprising a base member, a barrier wall member, and a resilient member, said base member being formed of a planar, relatively flexible, first plastic material and having outer and inner surfaces bounded by a peripheral edge, said barrier wall member being formed of a planar, relatively flexible, second plastic material and having outer and inner surfaces bounded by a peripheral edge, said resilient member being formed of a foam material and having an outer configuration corresponding to that of said barrier member, said barrier member and said resilient member being heat sealed to each other along their entire peripheral edges, said base member being heat sealed to said barrier wall member along only a portion of the peripheral edge of said base member thereby forming a free marginal edge portion of said base member and a hollow pocket between said barrier wall member and said base member, with said hollow pocket having an open entrance mouth defined between the free marginal edge portion of said base member and the contiguous portion of said barrier wall member, said free marginal edge portion extending generally linearly transversely across substantially the full width of said barrier wall member, said entrance mouth being located at an intermediate position along said pad, whereupon a portion of said barrier wall member is not covered by said base member to form an outer surface extending beyond said free marginal edge portion over which a portion of said clip-on earring may readily slide to enable said earring portion to readily enter said pocket through said entrance mouth, said barrier wall member protecting the material of said resilient member from wear when said portion of said clip-on earring is located within said pocket.

**5,035,124**

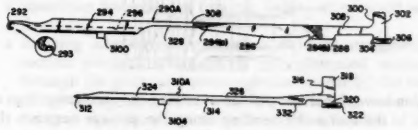
## CIRCULAR WEFT KNITTING MACHINE

**E. C. Tibbals, Jr., 2216 Guilford College Rd., Jamestown, N.C. 27282**

**Division of Ser. No. 901,298, Aug. 28, 1986, Pat. No. 4,763,492, which is a continuation-in-part of Ser. No. 398,303, Jul. 14, 1982, Pat. No. 4,608,839. This application Aug. 5, 1988, Ser. No. 228,957**

**Int. Cl.[5] D04B *35/06***

**U.S. Cl. 66—120** **5 Claims**




1. In a compound needle assembly for circular knitting machines that includes:

a needle element and a closing element longitudinally displaceable relative thereto, and

wherein said closing element has a body portion having a tapered tip at a first terminal end thereof and a pair of outwardly extending, spaced apart coplanar cam butts at a second terminal end thereof, and

said needle element has an elongate body portion with a yarn engaging hook member at the first terminal end thereof and a pair of outwardly extending, spaced coplanar cam butts at a second terminal end thereof and an intermediate bifurcated portion defining a generally U shaped lineal channel sized to slidably contain the upper portion of said closing element and to guide the path of displacement of the tip portion thereof into and out of closing engagement with the hook member,

the improvement comprising

a pair of coaligned cam butts extending outwardly from the defining walls of said U shaped channel in said needle element and

a cam butt extending outwardly from the intermediate body portion of said closing element and positioned in coaligned relation between the cam butts extending outwardly from the defining walls of said U shaped channel in said needle element when the tapered tip of said closing element is disposed in closing engagement with said hook member.

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**5,035,125**

## SLIDE-FASTENER STRINGER HALF WITH KNITTED-IN COUPLING COIL

**Alfons Fröhlich, Essen, Fed. Rep. of Germany, and Anton Probst, Frick, Switzerland, assignors to Opti-Patent-, Forschungs-und Fabrikations-AG, Riedern-Allmeind, Switzerland**

**Filed Feb. 16, 1990, Ser. No. 481,363**

**Claims priority, application Fed. Rep. of Germany, Feb. 25, 1989, 3905933; Feb. 25, 1989, 3905934; Feb. 25, 1989, 3905935**

**Int. Cl.[5] D04B *23/08***

**U.S. Cl. 66—193** **9 Claims**

1. A slide fastener stringer half comprising:

a coupling coil having a row of turns defining a longitudinal passage and each formed with

a coupling head,

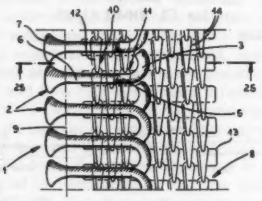
an upper leg and a lower leg extending transversely from the head and flanking the passage, and

a bight extending from one of the respective legs to the other leg of the adjustment turn; and

a knitted tape against which the lower legs engage and from a longitudinal edge of which the heads project, the tape being formed of

a plurality of outer warp chains adjacent the coil,

an upper inner warp chain overlying both the upper and lower legs of the coils, and



a lower inner warp chain overlying only the lower legs of the coil and extending along the passage between the upper and lower legs of the coil, the outer and inner warp chains being formed of stitches each extending longitudinally over at least two courses, the stitches of the upper chain being staggered by one course relative to the stitches of the lower chain.

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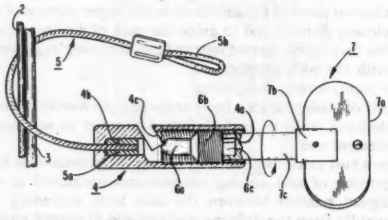
**5,035,126**

**DETACHABLE SECURITY ASSEMBLY**

**Kenneth Biba, 250 N. 21st St., Kenilworth, N.J. 07033, assignor to Kenneth R. Biba and Virginia A. Biba, both of Kenilworth, N.J.**

**Filed Apr. 23, 1990, Ser. No. 512,472**
**Int. Cl.[5] E05B *73/00***
**U.S. Cl. 70—18** **7 Claims**



1. A latch for securing the door of a cage or cell comprising in combination:

a hollow metal barrel having a first internal screw threaded chamber open at one end which leads into a second chamber of constricted diameter which closes down to a small bore at the other end;

said barrel having a cut which penetrates through the lateral wall into the interior of said barrel adjacent said second chamber;

a cable having one end slideably held in place in the small bore of said barrel and terminating at its other end in a fixed loop constructed to fit into said cut;

a screw threaded arbor stud constructed to fit into and to move to and fro in an axial direction between said first and second chambers in said barrel by engaging said internal screw threads in said first chamber, said arbor stud having a projection directed to engage and hold in place the loop of said cable when said loop is interposed into said cut;

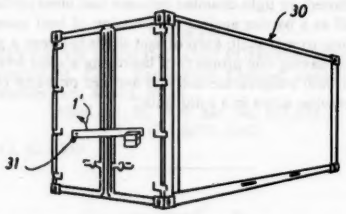
and means comprising a key constructed to be removably interposed into the open end of said barrel, and having means for engaging and turning said arbor stud to move said arbor stud in a longitudinal direction to and fro between said first and second chambers depending on whether said key is turned in a clockwise or counterclockwise direction.

**5,035,127**

**LOCK ARRANGEMENT FOR CONTAINERS**

**Allan R. Larsen, Graested, Denmark, assignor to Servial CC ApS, Denmark**

**Filed Sep. 29, 1989, Ser. No. 414,243**
**Int. Cl.[5] E05B *73/00***
**U.S. Cl. 70—56** **13 Claims**



1. A lock arrangement for containers comprising a crossbar and a counterpart, the crossbar and/or the counterpart being equipped with at least one lock member provided with a hole, a padlock with a straight shackle for insertion through the hole or holes of said lock member or members to lock said crossbar and counterpart together by means of the padlock, a housing mounted on the crossbar or the counterpart for surrounding the lock member or members, said housing being shaped and arranged in such a way that it tightly encloses the padlock and the lock member or members when the padlock and the straight shackle are in their locked position, the housing and the lock member or members furthermore being such that the padlock is insertable in the housing via an opening therein by a rectilinear movement in at least two directions perpendicular to each other, and the crossbar and the counterpart being fastened to the container by means of burglar-proof fastening means.

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**5,035,128**

**ANTI-ROTATION LOCK APPARATUS FOR INSIDE DEADBOLT LOCKS**

**David R. Ridgway, 6949 E. Oberlin, Tucson, Ariz. 85710**

**Filed Sep. 20, 1990, Ser. No. 585,801**
**Int. Cl.[5] E05B *13/08***
**U.S. Cl. 70—211** **7 Claims**

1. For doors having a handle and a lock with a rotating element, apparatus for preventing the rotation of the rotating element, comprising in combination:

base element means secured to the rotating element of the lock, including

a generally V-shaped element having a base leg and an angled leg disposed at an acute angle to the base leg, the base leg and the angled leg defining a notch for receiving the rotating element; and

extension means selectively securable to the base leg and to the angled leg of the base element means and disposed against the handle to prevent the rotation of the rotating element.

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5,035,129

## REPETITION RIVETING APPARATUS

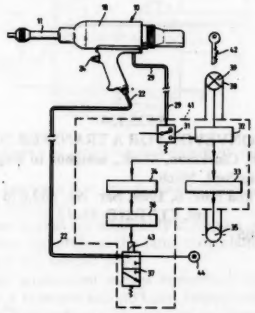
Keith Denham, Welwyn, and Aiden R. Dear, Stotfold, Nr. Hitchin, both of England, assignors to Avdel Systems Limited, Welwyn Garden City, England

Filed Jul. 19, 1990, Ser. No. 554,450

Claims priority, application United Kingdom, Jul. 21, 1989, 8916702

Int. Cl.[5] B21J *15/18*

U.S. Cl. 72—30 7 Claims



1. Repetition riveting apparatus for installing a plurality of rivets in succession, which apparatus comprises:

a body;

a reusable mandrel having an enlarged head;

pulling means for pulling the mandrel with respect to the body to pull the mandrel head through a tubular rivet which is supported by the body;

counting means for counting the total number of times the pulling means has operated to pull the mandrel with respect to the body as aforesaid;

and warning means responsive to the counting means for giving a warning when the mandrel has been pulled a predetermined number of times.

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5,035,130

## ANTIROTATION STRAIGHTENING MACHINE

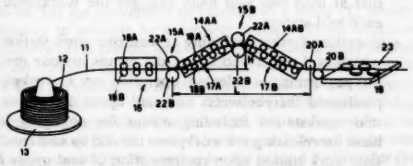
Giorgio Del Fabro, Cassacco Fraz. Montegnacco, and Marcello Del Fabro, Udine, both of Italy, assignors to M.E.P. Machine Elettroniche Piegatrici SpA, Italy

Division of Ser. No. 125,005, Nov. 24, 1987, Pat. No. 4,876,873. This application Jul. 31, 1989, Ser. No. 386,769

Claims priority, application Italy, Nov. 26, 1986, 83445 A/86; Aug. 21, 1987, 83441 A/87; Oct. 6, 1987, 83467 A/87

Int. Cl.[5] B21F *1/02*

U.S. Cl. 72—162 18 Claims



1. An antirotation straightening machine for elongated solid bar-shaped or elongated tubular sections, comprising, substantially on a single plane:

a guide and prestraightener assembly for initially straightening the elongated sections;

means for guiding the initially straightened elongated sections through at least two straightening assemblies, wherein each of the straightening assemblies includes multiple pairs of rollers, and each of the pairs of at least one of the straightening assemblies is in position such that a portion of the elongated sections travelling therethrough travels along a path forming an S- or Z-shaped half-loop so as to prevent rotation of the elongated sections about their axes while the sections are straightened, the multiple pairs of the at least one straightening assembly being arranged so that opposed rollers of each pair are staggered along the path;

a linearizing assembly for forming linear, straightened sections; and

a finishing assembly for forming a finished, straightened section product, the path of the elongated sections through the guide and prestraightener assembly, the two straightening assemblies and the linearizing assembly being in a single plane throughout the operation of the machine.

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5,035,131

## ROLL STAND FOR A PLANETARY ROLLING MILL

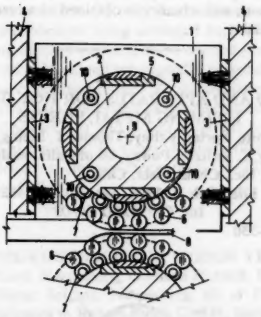
Peter Fink, and Dieter Figge, both of Essen, Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany

Filed Aug. 28, 1990, Ser. No. 573,853

Claims priority, application Fed. Rep. of Germany, Aug. 29, 1989, 3928962

Int. Cl.[5] B21B *13/20*

U.S. Cl. 72—190 12 Claims



1. A roll stand for a planetary rolling mill comprising stationary support bodies with rolling segments mounted in chocks, and intermediate and work rolls mounted in cages and rotating around the support bodies, the chocks having a square basic shape, and each support body being provided with four rolling segments distributed uniformly on its periphery and being further provided at each end with a respective turnable rolling ring having a recess.

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5,035,132

## APPARATUS FOR ROTATING AND ADVANCING STOCK IN PILGRIM STEP COLD ROLLING MILLS

Josef Gerretz, Viersen, Fed. Rep. of Germany, assignor to Mannesmann AG, Fed. Rep. of Germany

Filed Mar. 18, 1988, Ser. No. 170,284

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1987, 3709008

Int. Cl.[5] B21D *7/02*

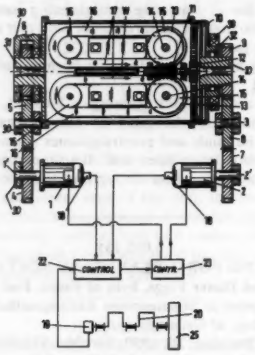
U.S. Cl. 72—214 7 Claims

7. A device for turning and advancing rolled stock in a pilgrim step cold rolling mill comprising:

transport means of the endless variety for gripping and advancing the stock;

a housing for mounting the transport means, the housing being mounted for rotation about a longitudinal axis so that upon rotation of the housing about said axis, the stock rotates about its longitudinal axis;

first motor and gear means connected to the transport means for driving same;



second motor and gear means connected to the housing for rotating the housing and the transport means therein; and

control means connected to the first and second motor and gear means so that the rotation is obtained as a result of a rotation as provided by said first and second motor and gear means, and advance is obtained as a result of a speed differential.

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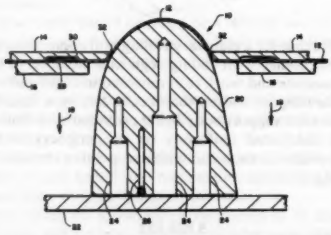
**5,035,133**

## METHOD AND APPARATUS FOR HOT DIE DRAW FORMING METAL SHEETS

**Robert T. White, Spring Valley; Thomas J. Liebig, Chula Vista, and Jeffrey K. Switzer, Poway, all of Calif., assignors to Rohr Industries, Inc., Chula Vista, Calif.**

**Filed Feb. 9, 1990, Ser. No. 477,452**
**Int. Cl.[5] B21D *24/08***
**U.S. Cl. 72—350** **8 Claims**



1. The method of drawing forming sheet metal into a product having a complex shape which comprises the steps of:

providing a male form conforming to the interior shape of the product;

providing upper and lower draw plates having relative movement therebetween, said upper plates each having an edge conforming to a corresponding surface of said male form and an elongated upstanding bead on the upper surface of said lower plate and a corresponding groove on the lower surface of said upper plate, said groove in said lower surface having sufficient width to accommodate relative movement between the bead and groove surfaces during drawing;

clamping a sheet of metal between said upper and lower plates, said bead and groove adapted to press said sheet therebetween during drawing;

heating said sheet and said male form to a selected elevated temperature; and

drawing said sheet of metal downwardly, transverse to said relative movement of said upper and lower draw plates, over said male form with said upper plate edge pressing said metal sheet firmly against said male mold;

the clamping pressure between said upper and lower plates selected to allow said sheet to slip from between said plates as drawing progresses.

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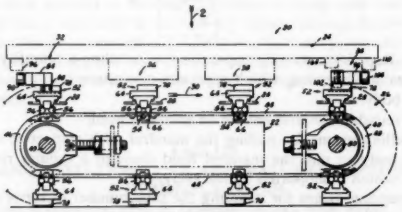
**5,035,134**

## INDEXING CONVEYOR FOR A TRANSFER DIE SYSTEM

**Alfred C. Fisch, Clarkston, Mich., assignor to Rapindex Incorporated, Waterford, Mich.**

**Filed Nov. 6, 1989, Ser. No. 432,076**
**Int. Cl.[5] B21D *43/12***
**U.S. Cl. 72—405** **35 Claims**



1. A transfer die system that includes lower die means, upper die means carried for reciprocal movement toward and away from said lower die means to perform operations on workpieces positioned between said die means, and means sequentially conveying workpieces between and die means, wherein said conveying means comprises:

An endless-loop conveyor having one reach positioned between said upper and lower die means, a plurality of hands carried by said conveyor and including means for selectively engaging individual workpieces, and means for indexing said conveyor and workpieces engaged by said hands between said upper and lower die means,

said upper and lower die means including means forming a plurality of stations spaced from each other lengthwise of said conveyor reach, said hands spaced from each other lengthwise of said conveyor by distances corresponding to separation between said stations such that at least one said hand engages the workpiece at each said station,

said stations further including at least one work station at which said upper and lower die means include means for performing a selected operation on a workpiece positioned therebetween, and said upper die means at said workstation including means for engaging said hand for releasing the workpiece carried by said hand at said work station upon reciprocation of said upper die means toward said lower die means and re-engaging the workpiece at said work station upon reciprocation of said upper die means away from said lower die means.

5,035,135

## CAR BODY FRAME STRAIGHTENING APPARATUS

Toivo Mäkelä, Hyvinkää, Finland, assignor to Raine Vierto, Selki, Finland

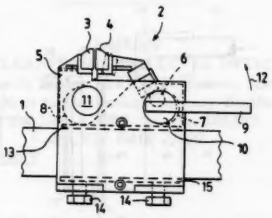
PCT No. PCT/FI88/00158, § 371 Date Jul. 26, 1989, § 102(e) Date Jul. 26, 1989, PCT Pub. No. WO89/02791, PCT Pub. Date Apr. 6, 1989

PCT Filed Sep. 30, 1988, Ser. No. 376,050

Claims priority, application Finland, Oct. 1, 1987, 874313

Int. Cl.[5] B21D 1/12

U.S. Cl. 72—422 4 Claims



1. A car body frame straightening assembly comprising:

a frame jig;

a rim clamp having a first jaw movable thereon and a second jaw fixed thereon;

an adjustment means for adjustably clamping the rim clamp to the frame jig while at the same time clamping the first jaw against the second jaw;

wherein said adjustment means comprises two eccentrics driven by a first and second cam, respectively;

wherein the first and second cams are mounted on a single shaft for rotation;

wherein the first eccentric means is located on the movable first jaw to cause the movable first jaw to be brought into clamping position with the second jaw by the first cam means when the shaft is rotated; and

wherein the second eccentric is mounted on a movable clamping means on the rim clamp which presses against the frame jig to clamp the rim clamp to the frame jig in response to rotation of the second cam means when the shaft is rotated.

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5,035,136

## BENDING APPARATUS FOR BENDING A MARGIN FLANGE

Michael W. Dorsett, Weybridge, Great Britain, assignor to AB Volvo, Gothenburg, Sweden

PCT No. PCT/SE89/00105, § 371 Date Aug. 15, 1990, § 102(e) Date Aug. 15, 1990, PCT Pub. No. WO89/09101, PCT Pub. Date Oct. 5, 1989

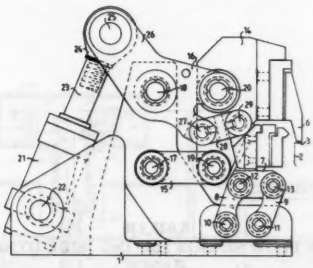
PCT Filed Mar. 7, 1989, Ser. No. 566,402

Claims priority, application Sweden, Mar. 21, 1988, 8801036

Int. Cl.[5] B21D 5/00, 39/02

U.S. Cl. 72—450 3 Claims

1. Apparatus for bending a margin flange (4), which projects at an angle to a surface on a workpiece (3) against said surface, said apparatus including a preliminary bending tool (5), which is mounted on a first tool holder (7) carried by a linkage mechanism (8–13) for movement in relation to a stand (1) which is stationary in relation to a support surface (2) on which the workpiece (3) is placed, and further including a bend finishing tool (6) which is mounted on a second tool holder (14) carried by a first parallelogram linkage mechanism (15–20) for movement in relation to the stand (1), said parallelogram linkage mechanism comprising first links (15, 16) having each at one end a pivot axis (17, 18) carried by the stand (1) and at the other end a pivot axis (19, 20) carried by the second tool holder (14), the distance between the stand-carried pivot axes (17, 18) being equal to the distance between the pivot axes (19, 20) carried by the second tool holder (14) and the distance between the pivot axes (17, 19) on one link (15) being equal to the distance between the pivot axes (18, 20) on the other link (16), and also a drive arrangement (21–24) for driving the two tool holders (7, 14), said drive arrangement including a single drive member (21) for driving the second tool holder (14), and a drive link (28) which is connected between the first parallelogram linkage mechanism (15–20) of the second tool holder (14) and the first tool holder (7) for driving said first tool holder, characterized in that the linkage mechanism between the first tool holder (7) and the stand (1) is a second parallelogram linkage mechanism (8–13) comprising second links (8, 9) having each at one end a pivot axis (10, 11) carried by the stand (1) and at the other end a pivot axis (12, 13) carried by the first tool holder (7) and wherein the distance between the stand-carried



pivot axes (10 11,) is equal to the distance between the pivot axes (12, 13) carried by the first tool holder (7) and the distance between the pivot axes (10, 12) on one of said second links (8) is equal to the distance between the pivot axes (11, 13) on the other of said second links (9), said first and second parallelogram linkage mechanisms being arranged such that an imaginary connecting line between the stand-carried pivot axes (10, 11) of the second links extend substantially perpendicular to an imaginary connecting line between the stand-carried pivot axes (17, 18) of the first parallelogram linkage mechanism (15–20) of the second tool holder (14), and in that the single drive member (21) is connected between the stand (1) and a first link (16) in the first parallelogram linkage mechanism (15–20) of the second tool holder (14).

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5,035,137

## TIRE PRESSURE SENSOR FOR MOTOR VEHICLES

Johannes Burkard, Nuremberg; Gerhard Hettich, Dietenhofen, and Hans-Dieter Schmid, Nuremberg, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Japan

PCT No. PCT/DE88/00241, § 371 Date Jan. 10, 1990, § 102(e) Date Jan. 10, 1990, PCT Pub. No. WO89/00511, PCT Pub. Date Jan. 26, 1989

PCT Filed Apr. 22, 1988, Ser. No. 459,753

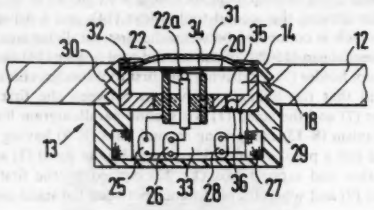
Claims priority, application Fed. Rep. of Germany, Jul. 16, 1987, 3723510

Int. Cl.[5] B60C 23/02; G01L 9/00

U.S. Cl. 73—146.5 6 Claims

1. A tire pressure sensor to be secured at a circumference of a rim of a wheel of a motor vehicle for monitoring air pressure in the wheel tire, said tire pressure sensor comprising a reference pressure chamber including a base and a bushing insulator arranged in said base: an electrically conducting diaphragm for separating said reference pressure chamber from a tire interior; a first contact pin extending in a center of said base through said bushing insulator; and a contact body extending through said bushing insulator adjacent to said first contact pin, said diaphragm having a first contact zone for engaging said first contact pin, upon being in response to air pressure in the wheel tire reaching a first predetermined value, to close a first resonant circuit, and a second contact zone for engaging said

contact boby, upon being bent in response to air pressure in the wheel tire reaching a second predetermined value greater than




the first predetermined value, to close a second resonant circuit.

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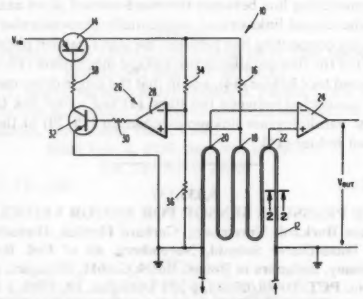
**5,035,138**

## MASS FLOW SENSOR HAVING WIDE DYNAMIC RANGE

**Mahmoud F. Abdel-Rahman, West Grove, Pa., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Apr. 23, 1990, Ser. No. 512,857**
**Int. Cl.[5] G01F *1/68***
**U.S. Cl. 73—204.15** **24 Claims**



1. Apparatus for sensing the mass flow of a fluid and for generating an output signal representative of the sensed mass flow, comprising:

a conduit, for the passage of said fluid therethrough, said conduit formed from resistive material;

a voltage source, connected to a first point on said conduit, for providing a voltage to said first point in response to a control signal;

a differential amplifier having at least two inputs for generating said output signal, wherein said output signal is representative of the difference in voltage between said two inputs, wherein one of said inputs is connected to a second point on said conduit, and wherein the other of said inputs is connected to a third point on said conduit, said second point being spaced up stream from said third point; and

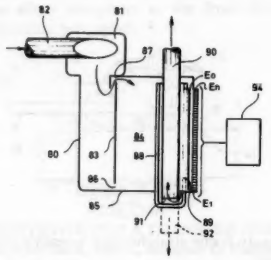
control means, connected to said voltage source, for generating said control signal so that the voltage provided to said first point is controlled in relation to the flow of fluid through said conduit.

**5,035,139**

## PROCESS AND A DEVICE FOR CARRYING OUT MEASUREMENTS AT A FOAMING LIQUID

**Tilman Hoefelmayr, Niederteufen, and Dieter Schulz, Eching-Viecht, both of Fed. Rep. of Germany, assignors to Biomelktechnik Hoefelmayr & Co., Niederteufen, Switzerland**

**Filed Nov. 4, 1988, Ser. No. 268,025**
**Claims priority, application Fed. Rep. of Germany, Nov. 5, 1987, 3737607**
**Int. Cl.[5] G01F *1/76, 23/00, 25/00*; G01N *9/00***
**U.S. Cl. 73—223** **51 Claims**




2. A process for the measurement of the flow of a foaming liquid, in which a measuring value ($I_m$) depending on the same parameter of the liquid contained in a vessel is in each case measured at several different height levels, comprising the steps wherein liquid is supplied to the vessel, wherein liquid flows off continuously via a substantially vertical measuring slot, wherein a reference measuring value ($I_O$) is measured on a reference measuring path containing substantially degassed liquid, wherein as a function whether the measuring value ($I_L$) measured across a corresponding measuring path in air is greater or smaller than the reference measuring value, a ratio value ($c_m$) according to the division of one of the reference measuring value ($I_O$) and the measuring value at the respective height level ($I_m$) by the other is formed for each height level (m), wherein in accordance with a preceding calibration a corrected ratio value ($c'_m$) which is equal to 1 for the degassed liquid and substantially equal to zero for air is formed and wherein the liquid mass flowing off through the measuring slot per time unit is determined from the equation

$$m_{eff} = \left(K \cdot \sum_{m=1}^{n} \sqrt{c'_m \cdot \sum_{i=m}^{n} c'_i}\right)\left(1 - a\sqrt{K \sum_{m=1}^{n} \sqrt{c'_m \sum_{i=m}^{n} c'_i}}\right)$$

wherein

$$m_{eff} = \left[\frac{g}{sec}\right] = \text{total mass flow leaving the slot}$$

$$K = d \times s \times \Sigma\sqrt{2\,gd}$$

d = distance between height levels

$$g\left[\frac{cm}{sec^2}\right] = 981\,\frac{cm}{sec^2}$$

S = slot width

$\rho\left[\frac{g}{cm^3}\right]$ = specific density of the liquid

n = total number of height levels

$c'_m$ = formed ratio value between 1 and 0 at the height level m

a = constant of the measuring device depending on slot width, slot edge and the like which can be ascertained by calibration.

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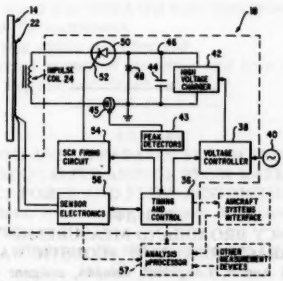
5,035,140

## SELF CLEANING LIQUID LEVEL DETECTOR

James W. Daniels, Renton, and Karl A. Hansen, Seattle, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Nov. 3, 1988, Ser. No. 266,839
Int. Cl.[5] G01F *23/00*
U.S. Cl. 73—290 V 22 Claims




1. Apparatus for detecting the contents level of a container having a wall subject to fouling by contaminants, including a wall portion having a conductive surface, comprising:

first responsive means, coupled to the conductive surface and responsive to input signals of first and second values, for selectively applying signals of first and second forces to the conductive surface, the first force being less than the second force and the second force being operative to vibrate the wall portion sufficient to dislodge contaminants from the wall portion;

sensing means, positioned adjacent to the conductive surface, for sensing a parameter which is a function of the forces and of the contents level of the container; and

means for generating an indicating signal representative of the parameter to indicate the contents level of the container;

wherein said sensing means has an output and wherein said means for generating an indicating signal comprises second responsive means, responsive to the frequency and amplitude of the output of said sensing means, for generating a fluids-status indicating signal indicative of the presence of contents and a contaminants-status indicating signal indicative of the presence of contaminants;

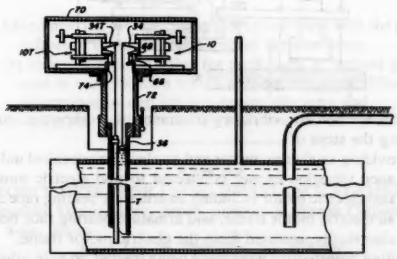
wherein said second responsive means comprises third responsive means, responsive to a first modal response of the output of said sensing means which exhibits a linear response to variations in content level of the container in the presence of contaminants, for generating the fluids-status indicating signal and fourth responsive means, responsive to a second modal response which exhibits a non-linear response to the content level of the container in the presence of contaminants, for generating the contaminants-status indicating signal.

5,035,141

## APPARATUS FOR MEASURING SMALL CHANGES IN LIQUID LEVEL IN A CONTAINER

William E. Baird, 55 Red Gate La., Cohasset, Mass. 02025, and Peter J. Tolan, 30 Greenfield La., Scituate, Mass. 02066

Division of Ser. No. 23,488, Mar. 9, 1987, Pat. No. 4,848,150, which is a continuation of Ser. No. 646,758, Sep. 4, 1984, abandoned. This application Dec. 9, 1988, Ser. No. 281,675
The portion of the term of this patent subsequent to Nov. 28, 2006, has been disclaimed.
Int. Cl.[5] G01F *23/20, 23/32*
U.S. Cl. 73—296 21 Claims




1. A system for determining small changes in the level of liquid in a storage tank comprising:

first and second apparatus, each said apparatus comprising:

a frame including a rigidly mounted, vertical support member;

a pivoting mechanism including a pair of horizontal members pivotably joined to a pair of vertical members in a generally parallelogram configuration, the vertical support member of the frame constituting a first one of the pair of vertical members of the pivoting mechanism;

at least one of said horizontal members comprising a Y-shaped yoke pivotably mounted at two points to a pair of spaced apart support elements of the vertical support member;

a buoyancy member;

vertically movable means for supporting the buoyancy member in at least partial immersion in the liquid within the container, said supporting means being vertically movable in response to minute changes of buoyant force on the buoyancy member resulting from minute changes in liquid level; and

means for balancing the buoyancy member at a selected position in preparation for taking measurements of liquid level to determine changes in excess of a specified rate;

said second apparatus further including a tube having an open top and a closed bottom for extending substantially into the liquid to a point near the bottom of the tank, said tube when positioned within a tank being substantially filled to the level of the liquid in the tank with liquid from the tank, the buoyancy member of said second apparatus being supported at least partially immersed in the liquid within the tube;

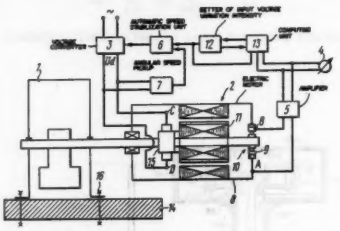
said buoyancy member of the second apparatus being contained within said tube; and

said buoyancy member support means being independent of any means for positioning said tube.

## 5,035,142
## METHOD FOR VIBRATORY TREATMENT OF WORKPIECES AND A DEVICE FOR CARRYING SAME INTO EFFECT

**Alexandr I. Dryga, ulitsa marata, 6, kv.64; Nikolai A. Zadorozhny, ulitsa Dnepropetrovskaya, 141, both of Kramatorsk; Mikhail A. Kuzmin, ulitsa Avangardnaya, 15, kv.39, Moscow, and Pavel M. Libman, Bolshe-Okhtinsky prospekt, 6, kv. 31, Leningrad, all of U.S.S.R.**

**Filed Dec. 19, 1989, Ser. No. 451,599**
**Int. Cl.[5] G01N *29/00***
**U.S. Cl. 73—579** **5 Claims**



1. A method for vibratory treatment of workpieces, comprising the steps of:

providing an electric motor and an electromechanical unbalance vibration exciter connected to said electric motor, said electric motor including an armature bearing race and an electric motor frame, said armature bearing race being electrically insulated from the electric motor frame;

exiting repeatedly a workpiece being treated, so as to vibrate the workpiece at resonant frequencies of various harmonics, by said electromechanical unbalance vibration exciter;

measuring an e.m.f. value of the electric motor between said armature bearing race and the electric motor frame continuously in the course of vibratory excitation of the workpiece at a resonant frequency of one harmonic of the workpiece;

tuning said vibration exciter to resonance at the resonant frequency of said workpiece, after said resonant frequency has been shifted due to said vibratory excitation, by changing a speed of rotation of the electric motor;

stabilizing the resonant frequency of said workpiece;

discontinuing the vibratory excitation at said harmonic when stabilization of the resonant frequency, at which the e.m.f. value changes no longer, is reached; and

changing over to vibratory treatment of said workpiece at an adjacent harmonic.

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## 5,035,143
## METHOD OF DETECTING CREEP SWELLING

**Paul J. Latimer, and Hubert L. Whaley, both of Lynchburg, Va., assignors to The Babcock & Wilcox Company, New Orleans, La.**

**Filed Apr. 10, 1990, Ser. No. 507,427**
**Int. Cl.[5] G01N *29/00***
**U.S. Cl. 73—598** **6 Claims**

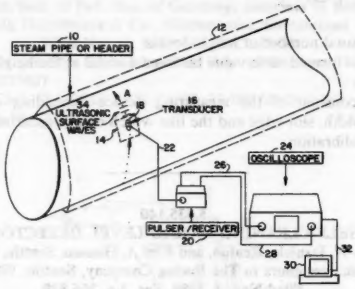
1. A method for detecting creep swelling in a tubular member, comprising the steps of:

positioning at least one ultrasonic transducer on the tubular member;

propagating ultrasonic surface waves circumferentially around the tubular member with at least one ultrasonic transducer;

determining a transit time of the propagated waves around the tubular member by overlapping pulses of successive transits then measuring difference in time of same;

determining the circumferential dimension of the tubular member from the transit time and a known velocity of sound in similar material; and




comparing the determined dimension with a reference dimension whereby a diametrical change in dimension reflects a measure of creep swelling in the tubular member.

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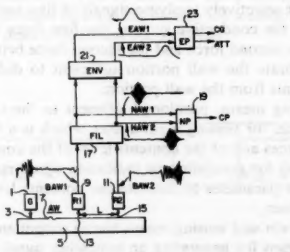
## 5,035,144
## FREQUENCY BROADBAND MEASUREMENT OF THE CHARACTERISTICS OF ACOUSTIC WAVES

**Jean-Daniel Aussel, Longueuil, Canada, assignor to National Research Council of Canada, Ottawa, Canada**

**Filed Jul. 31, 1989, Ser. No. 386,771**
**Int. Cl.[5] G01N *29/00***
**U.S. Cl. 73—602** **17 Claims**




1. A method of measuring the characteristics of acoustic waves propagating in an object for the purpose of nondestructive evaluation of the said object, comprising steps of:

a) generating in the said object frequency broadband acoustic waves,

b) detecting the said acoustic waves at a first and a second locations along the said object for producing a first and a second broadband signals respectively,

c) filtering the said first and the said second broadband signals at a center frequency F, to produce a first and a second narrow-band signals respectively, and

d) obtaining the phase propagation time TP at the said frequency F of the said acoustic waves propagating in the said object by processing in the time-domain the said first and the said second narrow-band signals.

## 5,035,145

### DIFFERENTIAL MANOMETER PRESSURE GAGE

Richard H. Spencer; Edward S. Shanley, both of Winchester, and Arthur A. Massucco, Natick, all of Mass., assignors to Arthur D. Little, Inc., Cambridge, Mass.

Filed Apr. 12, 1990, Ser. No. 508,821
Int. Cl.[5] G01L 7/16
U.S. Cl. 73—744 18 Claims

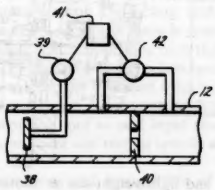
1. A manometer comprising:
a tube having at least a portion which is transparent or translucent;
said tube having a bore therein, a closed end, and an open end for coupling to a source of pressure to be measured;
said bore having a small diameter capable of maintaining a stable liquid slug within said bore throughout all orientations of the manometer;
a liquid slug within said bore; and
a preselected amount of gas within said bore between said liquid slug and said closed end.

## 5,035,146

### METHOD AND APPARATUS FOR DETERMINING STEAM QUALITY AND/OR FLOW RATE FROM IMPACT FORCE AND FLOW RESTRICTION DATA

Sze-Foo Chien, Houston, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed Jun. 28, 1990, Ser. No. 545,223
Int. Cl.[5] G01F 1/74
U.S. Cl. 73—861.04 14 Claims




1. A method for determining the quality and flow rate of steam, namely a mixture of liquid and vapor flowing through a pipe under subcritical to critical flow conditions comprising the steps of:
measuring the impact force of the steam flow;
measuring the pressure differential of the steam flowing through known flow restriction means; and
calculating the steam quality and flow rate from these measurements.

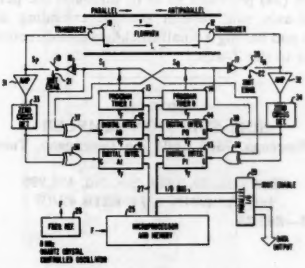
## 5,035,147

### METHOD AND SYSTEM FOR DIGITAL MEASUREMENT OF ACOUSTIC BURST TRAVEL TIME IN A FLUID MEDIUM

William S. Woodward, Chapel Hill, N.C., assignor to Curtin Matheson Scientific, Inc., Houston, Tex.

Filed Feb. 9, 1990, Ser. No. 478,101
Int. Cl.[5] G01F 1/66; G01H 5/00
U.S. Cl. 73—861.28 24 Claims

1. A method of determining the travel time of an acoustic wave in a fluid, said method comprising the steps of:
(a) generating a pair of bursts of acoustic waves at two different locations in a fluid medium;
(b) establishing a phase reference;
(c) receiving each burst at a location different from the generation location for that burst;



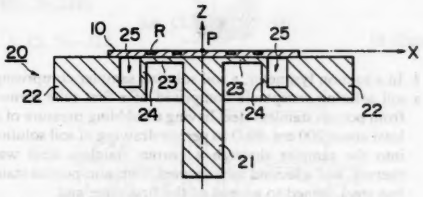
(d) comparing portions of each received burst with the phase reference to determine the phase therebetween;
(e) selecting a phase value for each burst to be next generated in each location which reduces any phase difference determined in step (d) to substantially zero; and
(f) using the result of step (d) to determine the travel time.

## 5,035,148

### FORCE DETECTOR USING RESISTANCE ELEMENTS

Kazuhiro Okada, Ageo, Japan, assignor to Wacoh Corporation, Ageo, Japan

Filed Jan. 25, 1990, Ser. No. 470,102
Claims priority, application Japan, Feb. 1, 1989, 1-23121; Jun. 17, 1989, 1-155032
Int. Cl.[5] G01L 5/16, 1/22
U.S. Cl. 73—862.04 13 Claims




12. A force detector comprising:
a strain generative body (20) for producing a mechanical deformation, and
a transducer for transforming said mechanical deformation into an electrical signal,
whereby when an origin (P) is taken on a plane surface of said strain generative body to define an XYZ three-dimensional coordinate system so that said plane surface is included in an XY plane of said three-dimensional coordinate system, said force detector is operative to detect a force exerted about a coordinate axis using said origin as a working point,
said strain generative body comprising:
a working portion (21) positioned below said origin and transmitting an applied force to said origin,
a fixed portion (22) for fixing the periphery of said strain generative body,
a first flexible portion formed between said working portion and said fixed portion and having flexibility with respect to a Z-axis direction, said first flexible portion being constituted by an annular flat plate portion (23) so as to surround the periphery of said Z-axis, said annular flat plate portion extending along a plane substantially perpendicu-

lar to said Z-axis and having a small thickness in said Z-axis direction, and

a second flexible portion formed between said working portion and said fixed portion and having flexibility with respect to a direction perpendicular to said Z-axis, said second flexible portion being constituted by a tubular portion (24) provided so as to surround the periphery of said Z-axis, said tubular portion extending along said Z-axis and having a small thickness in a direction perpendicular to the Z-axis.

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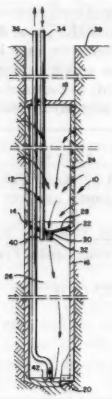
**5,035,149**

## SOIL SOLUTION SAMPLER

**Peter J. Wierenga, 7500 Calle Sin Desengano, Tucson, Ariz. 85718**

**Filed Dec. 29, 1989, Ser. No. 458,999**
**Int. Cl.[5] G01N *1/14*; E21B *49/08***
**U.S. Cl. 73—863.23** **9 Claims**



1. In a suction lysimeter, a soil solution sampler comprising:

a soil solution receptacle comprised of a first tube formed from porous stainless steel having a bubbling pressure of at least about 200 cm. $H_2O$ to permit drawing of soil solution into the sampler through a porous stainless steel wall thereof, and a second tube formed from non-porous stainless steel, joined to an end of the first tube; and

a sample transfer conduit extending into the receptacle for conveying sample from the sampler.

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**5,035,150**

## PIPETTING METHOD

**David J. Tompkins, Ashford, England, assignor to Kontron Instruments Holdings, N.V., Curacao, Netherlands**

**Division of Ser. No. 323,249, Mar. 9, 1989, Pat. No. 4,926,701.**
**This application Jan. 8, 1990, Ser. No. 462,073**
**Claims priority, application Switzerland, Aug. 14, 1986, 3263/86**
**Int. Cl.[5] G01N *1/14***
**U.S. Cl. 73—864.15** **2 Claims**

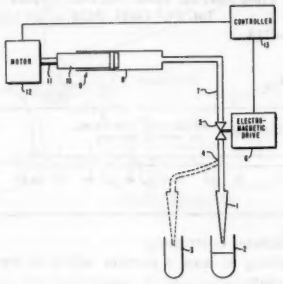
1. A method for accurately pipetting a predetermined quantity of liquid, comprising the steps of:

a. first drawing air and then the predetermined quantity of liquid into a pipette which includes pump means and valve means for controllably drawing in and expelling predetermined quantities of air and liquid;

b. expelling a portion of the liquid from the pipette by closing the valve means while a part of the liquid is left remaining in the pipette;

c. compressing the air drawn into the pipette in step a by maintaining the valve means closed while the pump means compresses the air drawn into the pipette; and

d. then rapidly expelling the compressed air from the pipette




along with the remaining part of the liquid by rapidly opening the valve means such that the rapidly expelled air rushes out of the pipette creating an air stream which entrains the remaining part of the liquid.

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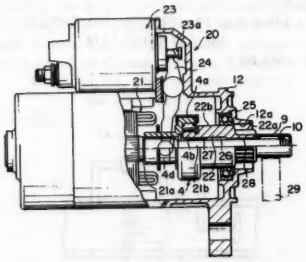
**5,035,151**

## ENGINE STARTER MOTOR

**Shuzoo Isozumi, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Sep. 27, 1989, Ser. No. 413,511**
**Claims priority, application Japan, Sep. 27, 1988, 63-243114**
**Int. Cl.[5] F02N *15/06***
**U.S. Cl. 74—7 A** **2 Claims**



1. A compact and lightweight starter motor for an internal combustion engine, comprising: an axially displaceable pinion directly driven by the starter motor and directly engageable with a ring gear of an engine to start the engine by the motor, said pinion being disposed in an over-hanging relationship relative to a front housing of the motor, and the number of teeth of said pinion being seven, and a bearing disposed between an outermost portion of the front housing and the pinion for absorbing a majority of a load imposed upon the pinion upon the engagement thereof with the ring gear, wherein an addendum modification coefficient of the pinion is equal to or less than 0.65, and preferably between 0.45 and 0.60.

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**5,035,152**

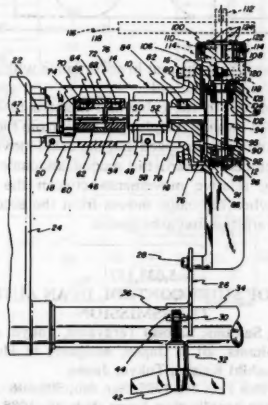
## SPEED INCREASER FOR WOODWORKING TOOLS

**James E. Berkeley, Dayton, Ohio, assignor to Shopsmith, Inc., Dayton, Ohio**

**Filed Feb. 23, 1990, Ser. No. 483,698**
**Int. Cl.[5] F16H *15/08, 15/10***
**U.S. Cl. 74—194** **18 Claims**

1. A speed changing device for connection to a woodworking tool having a headstock and an output spindle, said speed changing device comprising:

a housing having a front portion and a rear portion;
an input shaft supported for rotation within said rear portion of said housing;
an output shaft supported for rotation within said front portion of said housing;
a drive spindle attached to an end of said output shaft, said drive spindle including means defining a hole for receiving a rotatable tool bit,
a first substantially circular drive means attached to said input shaft for rotation therewith, said first drive means including a first contact portion defining a first circumference;
a second substantially circular drive means attached to said output shaft for rotation therewith, said second drive



means including a second contact portion defining a second circumference different from said first circumference of said first contact portion;
said first contact portion contacting said second contact portion whereby a frictional force is created between said first and second contact portions such that rotation of said input shaft at a first speed results in rotation of said output shaft at a second speed different from said first speed,
a coupling assembly for connecting said output spindle of said woodworking tool to said input shaft, said coupling assembly fitting over said output spindle and an end of said input shaft; and
a clamping portion at said rear portion of said housing for attaching said rear portion to said headstock of said woodworking tool.

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**5,035,153**

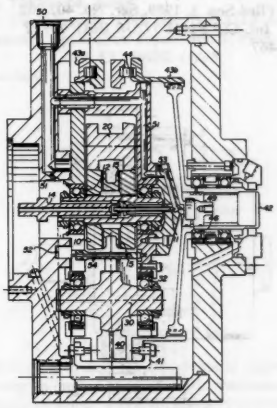
**LUBRICATION SYSTEM FOR ROLLER TRANSMISSION**

**William J. Anderson, North Olmsted, and Algirdas Bielskus, Cleveland, both of Ohio, assignors to Nastec, Inc., Cleveland, Ohio**

**Filed Jul. 26, 1990, Ser. No. 557,737**
**Int. Cl.[5] F16H *1/44***
**U.S. Cl. 74—206** **3 Claims**

1. A lubrication system for a roller transmission having a sun roller and at least a first row of surrounding planet rollers in contact with and driven by said sun roller, and a power takeoff ring roller surrounding and contacting and being driven by said planet rollers, or vice versa for speed increasing applications, said lubrication system comprising:
a first lubrication feed tube for supplying lubricant under positive pressure;
a conduit connected to said feed tube and located within said sun roller, said conduit being connected to a plurality of radially directed channels within said sun roller, whereby;

during rotation of said sun roller, lubricant is forced outwardly through said radially directed to channels to the



interface between said sun roller and said first row of surrounding planet rollers.

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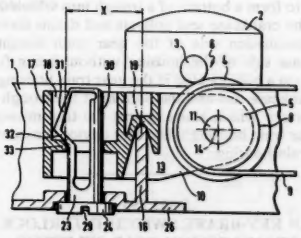
**5,035,154**

**ADJUSTMENT MECHANISM FOR A FRICTION DRIVE UNIT**

**Jürgen Jonischus, Romanshorn, Switzerland, assignor to Düpro AG, Romanshorn, Switzerland**

**Filed Apr. 13, 1990, Ser. No. 508,941**
**Claims priority, application Fed. Rep. of Germany, Apr. 15, 1989, 3912493**
**Int. Cl.[5] B62D *61/00***
**U.S. Cl. 74—213** **15 Claims**



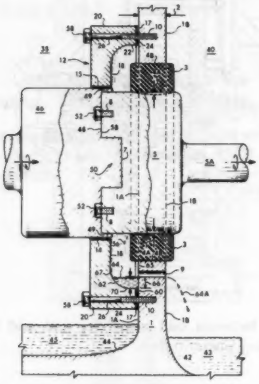
1. In an adjustment mechanism for a friction drive unit, whereby to adjust the contact pressure between a friction wheel and a cooperating wheel of said friction drive unit, one of said wheels of said friction drive unit is mounted on a lever that is pivotable about a pivot axis, the improvement comprising:
a housing;
cam means that rests against said lever for applying said contact pressure; and
means for shifting the distance of said cam means from said pivot axis of said lever, with said means for shifting the distance of said cam means being an adjustment bolt that has a longitudinal axis and is held in said housing in such a way as to be rotatable; and with said cam means being a part of said adjustment bolt and resiliently projecting from a surface thereof.

5,035,155

## DEVICE FOR PREVENTING CONTAMINATION OF TRANSMISSION FLUID

Ismael L. Robledo, 7855 Ivywood, Commerce City, Colo. 80022

Filed Sep. 1, 1989, Ser. No. 402,062
Int. Cl.[5] F16H *57/04*; B61F *15/22*
U.S. Cl. 74—467 23 Claims



1. A device for collecting automotive engine oil leaking from a crankcase seal located in a gear train housing which serves to partition an automotive transmission located on a transmission side of the gear train housing from an engine crankcase oil pan located on a crankcase side of said housing so that transmission fluid residing in the transmission side of the housing is not contaminated by the leaking engine oil, wherein said device comprises a plate-like housing having:

(1) a circular hole for permitting free rotation of a crankshaft/flywheel which extends into said hole;

(2) a front surface having a plurality of holes for receiving means for mounting the device to the transmission side of the gear train housing; and

(3) a rear surface having (a) a concave depression which serves to form a bottom of a trough into which oil leaking from the crankcase seal collects and drains directly from the transmission side of the gear train housing to the crankcase side of the housing without being further retained via a hole located in the gear train housing between the crankcase seal and the bottom of the trough and (b) a rim surface which abuts against the transmission side of the gear train housing when said device is mounted to the gear train housing.

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5,035,156

## IGNITION KEY-BRAKE SWITCH INTERLOCK FOR A TRANSMISSION GEAR SELECTOR

Chester W. Roble, Livonia, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Nov. 6, 1989, Ser. No. 432,257
Int. Cl.[5] B60K *41/26*
U.S. Cl. 74—850 6 Claims

1. An ignition key-brake interlock for a motor vehicle transmission gear shifter, comprising:

an ignition switch lever moveable between first and second operating states, having a first attachment moveable between first and second positions;

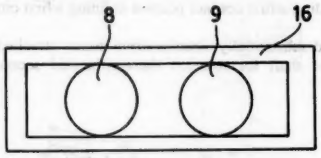
a cable connecting the first attachment to a second attachment moveable among positions representing selectable ranges in which the transmission operates;

an brake actuator for applying and releasing a brake;

interlock means for preventing movement of the first attachment from a first position when the ignition switch lever is in a first state, and for permitting movement of the first attachment from the first position when the ignition switch lever is in a second state;

switching means having an input connected to a source of electrical power and having an output, for opening and closing an electrical connection between said input and output in response to the state of said brake actuator;

a solenoid connected to the output of the switching means, having an immovable seat, and a plunger fixed to the seat




and released from the seat in accordance with the state of the switching means; and

means connected to the cable and adapted to contact the plunger, for moving the plunger away from the seat when the solenoid is deenergized and the cable moves from the first attachment toward the second attachment, and for permitting relative movement between the cable and plunger when the cable moves from the second attachment toward the first attachment.

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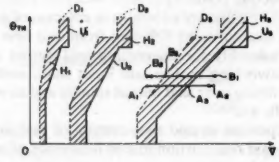
5,035,157

## METHOD OF SHIFT CONTROL IN AN AUTOMATIC TRANSMISSION

Takashi Aoki, Saitama; Satoshi Terayama, Tokyo, and Junichi Miyake, Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 10, 1989, Ser. No. 309,606
Claims priority, application Japan, Feb. 10, 1988, 63-029609
Int. Cl.[5] F16H *59/18*
U.S. Cl. 74—866 5 Claims



1. A method of shift control in an automatic transmission in a vehicle, wherein up-shifts and down-shifts are controlled based on a shift map having at least one shift-up line and at least one shift-down line, said shift map being established corresponding to a relation between vehicle speeds and engine throttle openings, said shift-up line being established on a higher vehicle speed side than said shift-down line and a hysteresis zone being established between said shift-up line and said shift-down line, comprising the steps of:

shifting down to a lower speed range when a point representing a traveling state of the vehicle on said shift map moves in a lower vehicle speed direction and crosses said shift-down line;

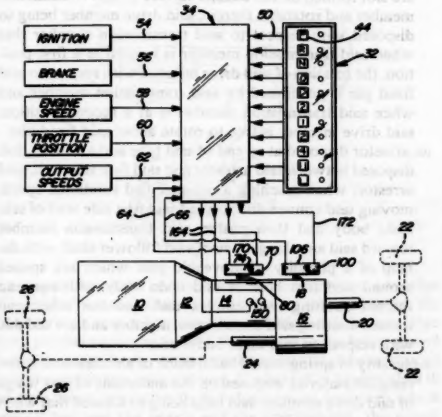
shifting up to a higher speed range when said point moves in a higher vehicle speed direction and crosses said shift-up line; and

shifting down to a lower speed range when said point is in said hysteresis zone after a shift of speed range and when engine power is increasing at a rate which is greater than a specified value.

## 5,035,158
## ELECTRIC SHIFT AND TRANSFER CASE APPARATUS WITH CONTROL SYSTEM THEREFORE

Keith V. Leigh-Monstevens, Troy, Mich., assignor to Automotive Products (USA) Inc., Auburn Hills, Mich.

Filed Sep. 25, 1989, Ser. No. 412,007
Int. Cl.[5] F16H *61/34;* B60K *12/34*
U.S. Cl. 74—866 15 Claims




1. A control system for a motor vehicle of the type including a passenger compartment and a transmission assembly including an automatic transmission having a mode select member having a plurality of discrete shift positions corresponding respectively to the shift modes of the transmission and operative in response to movement of the mode select member to its various shift positions to shift the transmission to the respective transmission shift modes, said control system comprising:

A) a control module adapted to be mounted in the passenger compartment and including a plurality of shift select positions corresponding respectively to the shift modes of the automatic transmission and means operative in response to operator selection of each shift select position to generate a shift signal representative of the selected shift mode;

B) an electronic logic module receiving input signals comprising said shift signals, a vehicle speed signal, and a transmission present position signal and operative

1) in response to operator selection of said shift positions to process said input signals in a manner to generate a first set of command signals including a command signal corresponding to each automatic transmission shift mode, and

2) to process said input signals in a manner to generate a second set of command signals;

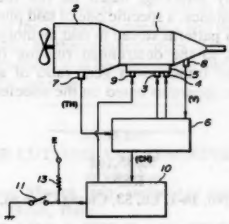
C) a power module, adapted to be drivingly connected to the mode select member, receiving said first set of command signals and operative in response to said first set of command signals to selectively move the mode select member between its various discrete shift positions to selectively shift the automatic transmission between its various shift modes; and

D) power means receiving said second set of command signals and operative to perform further shifting operations in the transmission assembly unrelated to the shifting movement of the mode select member by the power module.

## 5,035,159
## SHIFT CONTROL SYSTEM FOR AUTOMATIC TRANSMISSION

Takashi Shibayama, Isehara, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Jun. 30, 1989, Ser. No. 373,871
Claims priority, application Japan, Jul. 1, 1988, 63-162710
Int. Cl.[5] B60K *41/18*
U.S. Cl. 74—866 4 Claims



1. A shift control system for an automatic transmission for a vehicle having an engine, the automatic transmission selecting a shifting stage by selectively hydraulically operating a plurality of friction elements by a servo activating pressure, comprising:

manually operable means for modulating a demand for a shift feel and for generating a signal;

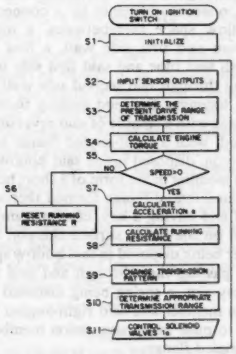
means for selecting one of a plurality of values of the servo activating pressure in response to said signal; and

means for controlling the servo activating pressure in accordance with said one of said plurality of values selected.

## 5,035,160
## AUTOMATIC TRANSMISSION CONTROL SYSTEM FOR A VEHICLE

Shigeki Morita, Himeji City, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 2, 1990, Ser. No. 487,513
Claims priority, application Japan, Mar. 3, 1989, 1-52248
Int. Cl.[5] B60K *41/18*
U.S. Cl. 74—866 4 Claims




1. An automatic transmission control system for a vehicle comprising:

an engine-rotation sensor (2) for sensing the number of revolutions per minute of an engine;

a load sensor (5) for sensing the load condition of the engine;

a speed sensor (3) for sensing the speed of the vehicle at which the vehicle is travelling;

an automatic transmission apparatus (1) having a plurality of

transmission gear ratios for changing the power to be transmitted from the engine to the driven wheels of the vehicle; and

a control unit (7) having memory means for storing a plurality of transmission shift patterns individually corresponding to a plurality of ranges of the running resistance of the vehicle, said control unit being connected to receive the output signals of said sensors for determining, through operational calculations, the running resistance of the vehicle based on the output signals of said sensors, and automatically selecting, based on the thus determined running resistance, a specific one of said plurality of transmission shift patterns stored in said memory means which corresponds to the determined running resistance, and changing the transmission gear ratio of said automatic transmission apparatus based on the selected transmission pattern.

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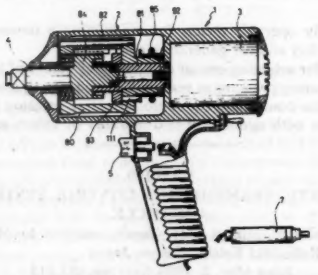
**5,035,161**

**WRENCH**

**Dora H. Huang, No. 14-1, La. 53, Chung Chen St., Shin Chuang, Taiwan**

**Filed Aug. 8, 1990, Ser. No. 564,449**
**Int. Cl.[5] B25B *13/00***
**U.S. Cl. 81—54** **1 Claim**



1. A wrench comprising a housing inside which a reversible motor, serving as a torque source and controlled by switching means is disposed, said wrench further comprising, inside said housing, a torque transmitting mechanism which comprises:

a main body, having a first side wall and a second side wall which are connected together by a connecting piece to form a hollow space therebetween, a tube projecting outward from said first side wall, a first hole running through both said tube and said first side wall, a second hole running through said second side wall;

a drive shaft, having a first end passing through said first hole to engage with a spindle of said reversible motor, and a second end, with a right-angled flange and a key slot formed thereon, disposed inside said hollow space;

a transmission member in the form of a short hollow cylinder with a circumferential flange formed therearound at one end thereof and having a key, corresponding to said key slot, formed on the inside surface thereof, said transmission member being disposed in said hollow space with said drive shaft passing therethrough and said key engaging with said key slot, a spring being disposed between said transmission member and said right-angled flange of said drive shaft to push said transmission member away from said right-angled flange;

a follower shaft having a first section insertable into a central hole running along an axle of said drive shaft with a bearing disposed therebetween, a second section having a shaped end to engage with a socket, and an expanded tooth part connecting said first and second sections together and having a pair of spaced teeth inclined toword each other, and annular groove being formed at the connection of said first section and said tooth part ot receive said second end of said drive shaft therein with said first section inserted into said central hole and said tooth part disposed inside said hollow space;

a drive member, which is in the form of a pair of wings connected together and is rotatable about a fixed pin running through said first side wall, said drive member and said second side wall, said wings being slightly slanted inwards and being so disposed with respect to said tooth part of said follower shaft that when said wings rotate about said fixed pin, one of them engages with and abuts against one of said teeth, said drive member further having an extension part, through which said fixed pin also runs, said extension part being so shaped that it is disposed in an arc slot formed on the outside surface of said transmission member and rotatable therein, said drive member being so disposed with respect to said transmission member that when said transmission member is located at a first position, the rotation of said drive member with respect to said fixed pin is prohibited by said transmission member and when said transmission member is at a second position, said drive member is free to rotate about said fixed pin;

an arrestor disposed at an end of said tube and a convex disk disposed between said arrestor and said first side wall, said arrestor, when reaching a pre-specified rotational speed, moving said convex disk toward said first side wall of said main body and then pushes said transmission member toward said annular groove of said follower shaft with the help of a plurality of moveable pins which are spaced around said first hole of said main body with one end thereof abutting said convex disk and the other end thereof abutting said transmission member and are slidable with respect to said main body; and

a plurality of spring-biased balls, made of abrasion-and wear-resistant material, disposed on the under side of said wings of said drive member, said balls being so located that when said transmission member is at said first position, said teeth of said tooth part of said follower contact only said balls and when said transmission member is at said second position, said teeth contact said balls and pushing one of said wings inwards to engage with one of said teeth.

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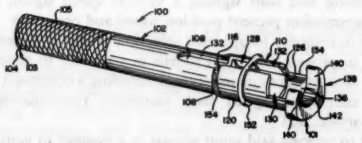
**5,035,162**

**INNER TIE ROD TOOL**

**David P. Dougherty, 6200 W. 128th St., Palos Heights, Ill. 60463**

**Continuation-in-part of Ser. No. 424,073, Oct. 19, 1989, abandoned. This application May 24, 1990, Ser. No. 528,220**
**Int. Cl.[5] B25B *13/06***
**U.S. Cl. 81—124.4** **2 Claims**



1. A tool particularly adapted to grip any of a plurality of different size of inner tie rod ends for the removal and replacement of an inner tie rod of a rack and pinion steering mechanism including:

a shaft having a longitudinal bore extending therein, said shaft adapted to receive a portion of said inner tie rod;

least one polygonal socket attached to said shaft for gripping engagement of an inner tie rod end, said socket including a slot; and

a claw attached to and spaced apart from said socket; said claw including two spaced apart parallel jaws for gripping engagement of an inner tie rod end.

and a receiving chamber disposed between said claw and

said socket, said receiving chamber adapted to receive one end of said inner tie rod.

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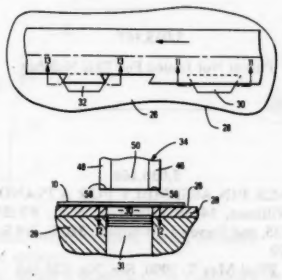
**5,035,163**

## PUNCHES AND DIES FOR TRIMMING THE EDGES OF STRIP MATERIAL

**Johannes C. W. Bakermans, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed Feb. 23, 1990, Ser. No. 483,849**
**Int. Cl.[5] B26F *1/02, 1/12***
**U.S. Cl. 83—86** **9 Claims**



**1**. A punch and die combination for trimming one raw edge of a strip of material thereby to produce a trimmed edge, the strip having a center line, the trimmed edge and the raw edge being parallel to the center line, the trimmed edge being spaced from the center line by a distance d, the raw edge being spaced from the center line by a distance d' where d' is greater than d, the strip being intermittently fed along a strip feed path which extends between the punch and die combination, the punch and die combination comprising:

die plate means having first and second die openings therein, the die openings being on the strip feed path with the first die opening being upstream, relative to the direction of strip feed, from the second die opening, and first and second punches which conform to the first and second die openings respectively and which enter the first and second die openings when the punches and dies move relatively towards and away from each other between open and closed positions,

each die opening having a die opening main shearing edge, the die opening main shearing edges being in alignment with each other and extending parallel to the strip feed path, the die opening main shearing edges being between the raw edge and the center line of the strip and spaced from the center line by the distance d,

each die opening has a die opening upstream shearing edge and a die opening downstream shearing edge, the upstream shearing edge of each die opening extending from the upstream end of the associated die opening main shearing edge laterally outwardly and being inclined in a downstream direction, the downstream shearing edge extending from the downstream end of the associated die opening main shearing edge laterally outwardly and being inclined in an upstream direction, the upstream and downstream die opening shearing edges extending beyond the raw edge of the strip,

each of the punches has a punch main shearing edge which is opposed to, and cooperable with, the associated die opening main shearing edge,

the first punch has upstream and downstream punch shearing edges extending from the upstream and downstream ends of the first punch main shearing edge, the upstream and downstream punch shearing edges being opposed to, and cooperable with, the upstream and downstream die opening shearing edges of the first die opening, the second punch having upstream and downstream rounded non-shearing edges extending from the upstream and downstream ends of the second punch main shearing edge which are opposed to the upstream and downstream shearing edges of the second die opening whereby,

during intermittent feeding of the strip material along the strip feed path and movement of the punch and die combination relatively towards and away from each other during non-feeding intervals, spaced apart notches will be punched from the raw edge by the first punch and first die opening, and the material between the notches will be removed by the second punch and second die opening, and any portions of the strip material which extend beyond the upstream and downstream shearing edges of the second die opening will be pulled into the second die opening by the rounded edges of the second punch, and the slugs produced will be trapezoidal and will be stacked in the second die opening.

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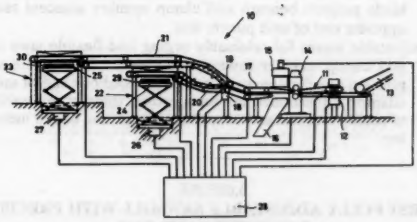
**5,035,164**

## DEVICE FOR CUTTING AND STACKING STRIPS OF WOOD

**Lorenzo Cremona, Monza, Italy, assignor to Angelo Cremona & Figlio S.p.A., Milan, Italy**

**Filed Feb. 5, 1990, Ser. No. 474,948**
**Claims priority, application Italy, Feb. 10, 1989, 19397 A/89**
**Int. Cl.[5] B27L *5/08*; B65G *15/04*; B27B *1/00***
**U.S. Cl. 83—80** **8 Claims**



**1**. A machine for removing defects from pieces of veneer and for forming and stacking sheets of veneer made up from a plurality of strips of veneer placed side by side, comprising conveyor means for feeding pieces of veneer in a first direction, detection means for scanning the pieces to locate defects, a cutter downstream of the detection means for cutting the pieces into strips extending transverse to the direction of travel, means for separating strips containing defects from those free of defects, a first conveyor belt for receiving the strips free of defects from the cutter and conveying them to at least one second conveyor belt having a length longer than the length of the sheet of veneer to be formed, measuring means for determining the width of each strip free of defects being conveyed to the second conveyor belt and control means responsive to the detection means for operating the cutter and separating means to remove strips containing defects from the pieces of veneer fed to the cutter and responsive to the measuring means for intermittently advancing the second conveyor belt a distance equal to the width of the strips received from the first conveyor belt so that the strips accumulate on said second conveyor belt in side by side relationship to form a sheet of veneer of the desired length and thereafter discharging said sheet to a stacking device.

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**5,035,165**

## QUICK SLIP HOLDER FOR BAG MACHINE

**Dale R. Madsen, 2392 Taylor Rd., Savannah, N.Y. 13146**

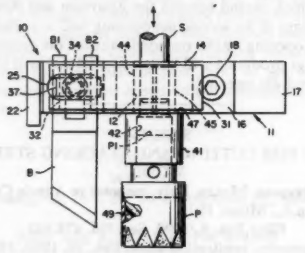
**Filed May 29, 1990, Ser. No. 529,646**
**Int. Cl.[5] B26F *1/02, 1/18***
**U.S. Cl. 83—618** **14 Claims**

**1**. In a plastic bag making machine having a reciprocable operating shaft for moving a punch and a slitter blade toward and away from a plastic bag, a holder device, comprising

a punch adaptor,

a clamp member disposed to be attached to said operating shaft for reciprocation thereby, and having thereon a pair of integral, flexible jaws defining therebetween an aperture for releasably retaining therein one end of said punch adaptor,

means for securing one end of a punch to the opposite end of said adaptor to be supported thereby on said clamp member so that the opposite end of said punch projects beneath said clamp member,



means on said clamp member for securing one end of a slitting blade releasably to said clamp member adjacent said jaws, and in such manner that the opposite end of said blade projects beneath said clamp member adjacent said opposite end of said punch, and

adjustable means for releasably urging said flexible jaws of said clamp member toward one another from a release position to a clamping position, when said one end of said adaptor is positioned in said aperture, thereby releasably to secure said one end of said adaptor in said clamp member.

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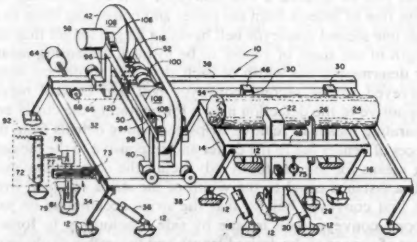
**5,035,166**

## FIRST FULLY ADJUSTABLE SAWMILL WITH PRECISE RAPID CUT BAND SAW

**John G. Carlson, La Crescent, Minn., and Larry L. McCumber, La Crosse, Wis., assignors to L. J. Manufacturing, Inc., La Crosse, Wis.**

**Filed Jul. 25, 1990, Ser. No. 557,689**
**Int. Cl.[5] B27B *13/08, 15/02***
**U.S. Cl. 83—801** **36 Claims**



1. A sawmill for cutting a log into boards, comprising:

a log supporting table;

a pair of rails running substantially parallel to the length of said table;

a trolley mounted to run along the length of said rails;

a band saw connected to said trolley;

a hydraulic actuated clamp adapted to hold said log fixed with respect to said table;

a hydraulic cylinder connected to vary the relative position of said table to that of said rails

a combination detent bar and a limit switch, one of which is coupled to said rails, said combination defining a first series of incremental changes in the position of said rails, one of the elements of said combination being selectively indexable to further define a second series of incremental changes in the position of said rails, said first and second series of incremental changes corresponding to first and second board thicknesses; and

a valve controlling the extension of said hydraulic cylinder in response to said limit switch such that substantially all relative motion of said rails stops after each incremental change in the position of said rails, thus allowing said band saw to cut said log after each incremental change.

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**5,035,167**

**Patent Not Issued For This Number**

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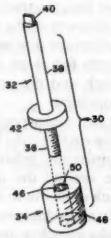
**5,035,168**

## BALANCE PIN ASSEMBLY FOR A PIANO KEY

**Wayne T. Williams, 14330 12th Ave., N.E., #315M, Seattle, Wash. 98125, and Steven L. Westfahl, 310 S. 3rd St., Laramie, Wyo. 82070**

**Filed May 7, 1990, Ser. No. 520,365**
**Int. Cl.[5] G10C *3/12***
**U.S. Cl. 84—435** **8 Claims**



1. A balance pin assembly for mounting a piano key, said balance pin assembly comprising:

(a) an insert installable in a hole of a piano keybed and having a central bore with internal threads formed therein; and

(b) an elongated balance pin installable into said central bore of said insert into frictional engagement therewith and adjustable in an axial direction into and from said insert to a set position for mounting a piano key at a desired height above said insert and thereby above the keybed of the piano, said balance pin including

(i) a lower base having external threads thereon threaded into said internal threads of said insert bore,

(ii) an upper elongated stem extending upwardly from said lower base and inserted through a slot in the piano key,

(iii) an intermediate annular shoulder rigidly attached to, and radially projecting outwardly from, said stem of said pin proximate the juncture of said base and stem such that said shoulder can support the piano key with said stem extending upwardly through the slot in the piano key, and

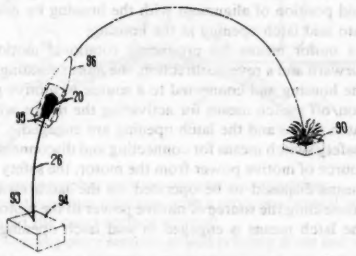
(iv) a head defined on a top end of said upper stem and configured for engagement by a tool to turn said balance pin for threading it into said insert, said head is shearable off said stem in response to overtightening of said external threads of said balance pin base within said internal threads of said insert bore to thereby prevent stripping of said internal threads of said insert.

**5,035,169**

## GUIDED VEHICLE SYSTEM

**John T. Chapin, Alpharetta; Charles W. Jackson, Dunwoody; Thomas O. Mensah, Doraville, and Mickey R. Reynolds, Lawrenceville, all of Ga., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Division of Ser. No. 328,930, Mar. 27, 1989, Pat. No. 4,955,688.**
**This application May 1, 1990, Ser. No. 517,088**
**Int. Cl.[5] F42B *15/04, 12/68;* F41G *7/32***
**U.S. Cl. 89—1.34** **8 Claims**




1. A guided vehicle system which includes:
a control station;
a vehicle which is adapted to be controlled by said control station; and
a package of optical fiber which is disposed in said vehicle, and from which optical fiber is adapted to be payed out, said package of optical fiber including:
a bobbin;
a plurality of convolutions of optical fiber which are wound on said bobbin; and
a curable adhesive material which has been applied to outwardly facing surface portions of each of said convolutions, said adhesive material including a silicone material having a modulus variation which is relatively stable with respect to time throughout a relatively wide operating temperature range at payout speeds which may be as high as about 300 meters per second and a solvent system which includes an aromatic solvent constituent and which is effective to prevent premature precipitation or premature curing of said adhesive material, and wherein said package is such that the optical fiber may be payed off an end of the bobbin without rotational motion of the bobbin about a longitudinal axis thereof.

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**5,035,170**

## DIRECT DRIVE VARIABLE DISPLACEMENT HYDRAULIC APPARATUS

**Mark S. Stroze, and William G. Durtschi, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.**

**Filed Aug. 30, 1989, Ser. No. 400,341**
**Int. Cl.[5] F04B *13/04***
**U.S. Cl. 91—486** **18 Claims**

1. A variable displacement hydraulic apparatus, comprising:
a cylinder block having a plurality of hydraulic cylinders therein, each of said hydraulic cylinders having a hydraulic piston disposed therein for reciprocating movement relative thereto, said hydraulic cylinders and pistons being disposed about an axis of said hydraulic apparatus;
a shaft operatively associated with said hydraulic pistons for relative driven movement therebetween;
a valve block having a hydraulic fluid inlet port for supplying hydraulic fluid to said hydraulic cylinders and a hydraulic fluid outlet port for returning hydraulic fluid from said hydraulic cylinders, said hydraulic fluid inlet port and hydraulic fluid outlet port communicating with said hydraulic cylinders through a port plate having at least one port slot therethrough, said port plate being variably angularly positionable relative to said hydraulic fluid inlet port and hydraulic fluid outlet port for varying displacement of said hydraulic apparatus; and
means for angularly positioning said port plate for varying displacement of said hydraulic apparatus, said angular positioning means being directly coupled to said port plate, said angular positioning means being electrically driven to rotate said port plate upon demand.

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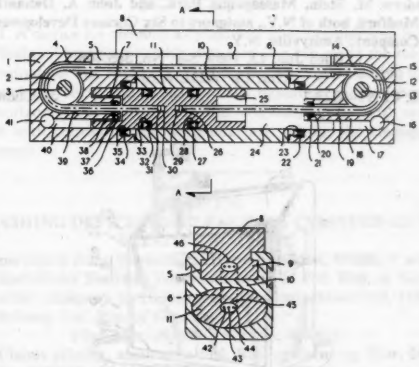
**5,035,171**

## WORKING CYLINDER AND TENSION MEMBER THEREFOR

**Helmut Gottling, Isernhagen; Rudolf Moller, Gehrden; Peter Muller, Hanover, and Gerhard Scharnowski, Gehrden, all of Fed. Rep. of Germany, assignors to WABCO Westinghouse Steuerungstechnik GmbH & Co., Hanover, Fed. Rep. of Germany**

**Filed Feb. 16, 1990, Ser. No. 480,739**
**Claims priority, application Fed. Rep. of Germany, Feb. 23, 1989, 3905561**
**Int. Cl.[5] F01B *9/00***
**U.S. Cl. 92—137** **13 Claims**



1. An improved working cylinder of the type actuated by a pressure medium, having a cam driven by a piston in conjunction with a flexible tension member, the tension member being passed, under seal, through respective ends of a cylinder in which the pressure medium is introduced, the cam adapted to run in a guide in a longitudinal direction with relation to the cylinder, the improvement comprising the tension member having a cross-section of variable radius with a uniform continuous outer peripheral line.

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**5,035,172**

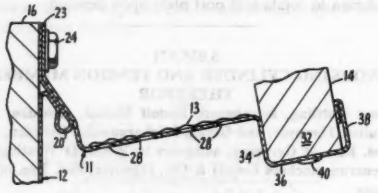
## ROOF VENTILATING APPARATUS

**Richard L. Waggoner, Riverside, Calif., assignor to Alumax Inc., San Mateo, Calif.**

**Filed May 24, 1989, Ser. No. 356,434**
**Int. Cl.[5] F24F *7/00***
**U.S. Cl. 98—37** **3 Claims**

1. For ventilating a space within a building having a gable occupying a first plane that is substantially perpendicular to the ground, a gable ventilator comprising:
a vent member having a first free edge configured for attachment to the gable, a central portion contiguous with said first portion, provided with a plurality of apertures and occupying a second plane that intersects the first plane of the gable to form a superior angle of less than 90°, and a third portion having a second free edge, contiguous to

said second portion and opposite said first portion and configured to form a longitudinal groove for snug receipt over an end of the eaves panel, said second free edge reflexed into the longitudinal groove to assist in securing the end of the eaves panel;




a bracket configured to receive and partially support said vent member on the gable; and

an eaves panel having an upper end and a lower end, said upper end in contact with the gable and said lower end received and supported by the vent member.

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**5,035,173**

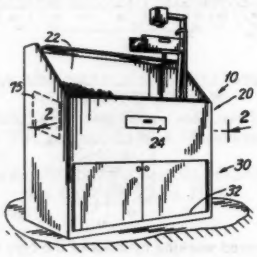
**AUTOMATIC POPCORN POPPING APPARATUS**

**Andrew M. Stein, Massapequa Park, and John A. DeSantis, Medford, both of N.Y., assignors to Six Corners Development Company, Amityville, N.Y.**

**Filed Jun. 13, 1989, Ser. No. 365,406**

**Int. Cl.[5] A23L *1/18***

**U.S. Cl. 99—323.7** **36 Claims**




1. An automated corn popping apparatus comprising:

kettle means for heating oil and popping corn therein;

means for delivering oil to said kettle means;

means for delivering uniform predetermined amounts of corn and salt to said kettle means;

means for emptying the contents of said kettle means at predetermined intervals; and

means for energizing each of the preceding means according to a predetermined sequence so that the kettle means is heated prior to the introduction of oil, corn and salt therein, and is emptied after substantially all of the corn has popped.

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**5,035,174**

**JUICE EXTRACTOR**

**John S. Seal, Jr., Ardmore, Pa., assignor to The John S. Seal, Jr., Revocable Trust, Philadelphia, Pa.**

**Continuation of Ser. No. 247,677, Sep. 22, 1988, abandoned. This application Feb. 23, 1990, Ser. No. 485,787**

**Int. Cl.[5] B30B *15/14, 9/02, 1/18***

**U.S. Cl. 100—52** **5 Claims**

1. Apparatus for extracting juice by compressing an object and collecting the juice extracted therefrom comprised of:

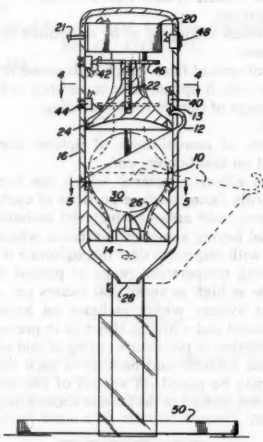
(a) a housing comprised of: (i) a latch opening means for receiving a latch comprising an opening in said housing; and (ii) at least one substantially axially oriented groove disposed within an inner portion of the housing;

(b) a substantially cylindrical pivotable cup means for retaining the object to be compressed, said cup means having a longitudinal center line and being attached to said housing at a pivot point so as to pivot about an axis between a position of alignment with the housing and a position permitting an object to be placed in the cup, the axis of said pivot point being substantially perpendicular to the longitudinal centerline of said cylindrical cup, the cup further comprised of latch means for retaining the cup in said position of alignment with the housing by extending into said latch opening in the housing;

(c) a motor means for producing rotational motion in a forward and a reverse direction, the motor residing within the housing and connected to a source of motive power;

(d) on/off switch means for activating the motor when the latch means and the latch opening are engaged;

(e) safety switch means for connecting and disconnecting the source of motive power from the motor, the safety switch means disposed to be operated by the latch means and connecting the source of motive power to the motor when the latch means is engaged in said latch opening in the




housing and disconnecting the source of motive power from the motor when the latch means is disengaged;

(f) upper and lower limit switch means for controlling the rotation of the motor;

(g) squeezing means for exerting a compressive force upon an object disposed within the pivotable cup comprising: (i) means for actuating said upper and lower limit switches; and means for cooperating with said at least one groove in the housing to prevent relative movement between the squeezing means and the housing except in the direction of said grooves; and (iii) a squeezing portion for urging against the object to be squeezed; and

(h) power screw means for converting the rotational motion of the motor to linear motion, comprising a threaded member having two ends, a first end attached to the motor and a second end attached to the squeezing means

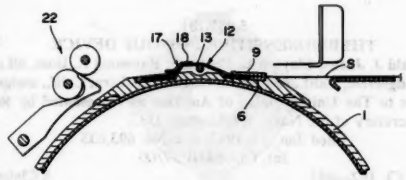
whereby, when the latch means and the latch opening are engaged and the source of motive power is connected to the motor and upon actuation by the on/off switch, the motor rotates the power screw means in the forward direction, urging the squeezing means into the cup until one of said limit switches is actuated, causing the rotation of the motor to stop.

5,035,175

## MIMEOGRAPHIC PRINTING APPARATUS AND CLAMPING DEVICE THEREFOR

Nagon Takita, and Yoshihiro Noguchi, both of Ushiku, Japan, assignors to Riso Kagaku Corporation, Tokyo, Japan

Filed Jun. 20, 1990, Ser. No. 541,121
Claims priority, application Japan, Jun. 22, 1989, 1-158408
Int. Cl.[5] B41L *13/06*
U.S. Cl. 101—116 4 Claims




1. A mimeographic printing apparatus comprising:
(a) a printing drum rotatable with a processed stencil wound around the outer surface thereof;
(b) a clamping piece secured to said printing drum and pivotable between a clamping position to fasten one end of the stencil on said printing drum and a non-clamping position to release the fastened end of the stencil;
(c) a removing means for removing the released stencil from the printing drum; and
(d) an elastic holding means disposed above the clamping position with a space from the printing drum enough to receive one end of the supplied stencil, said elastic holding means being engageable by said clamping piece to fasten one end of the stencil when said clamping piece is set at the clamping position, and returning to its position disposed above the clamping position when the clamping piece is pivoted from the clamping position.

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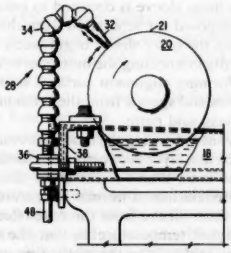
5,035,176

## FLUID DAMPER SYSTEM FOR PRINTING APPARATUS

Dale W. Miller, Glen Ellyn, Ill., and Thomas A. Crofutt, Shelton, Conn., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Filed Oct. 20, 1989, Ser. No. 425,007
Int. Cl.[5] B41L *25/06*
U.S. Cl. 101—148 3 Claims




1. A printing apparatus comprising a plate cylinder, fluid dampener means for delivering dampener fluid to said plate cylinder and including fluid supply means, roller means for delivering fluid from said supply means to said plate cylinder, nozzle means positioned adjacent only the ends of said roller means for depositing additional dampener fluid on said ends, means for mounting said nozzle means adjacent said roller means, said mounting means including flexible conduit means supporting said nozzle means and permitting adjustment thereof laterally and circumferentially with respect to said roller means so that said additional dampener fluid may be deposited at various points along the ends of said roller means, and control means for controlling the amount of additional dampener fluid delivered to said nozzle means.

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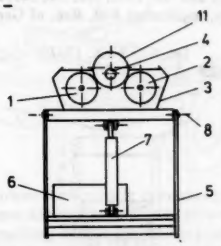
5,035,177

## DEVICE FOR CLEANING CYLINDRICAL STENCILS

Johannes Zimmer, Ebentalerstrasse 133, A-9020 Klagenfurt, Austria

Filed Sep. 17, 1990, Ser. No. 583,295
Claims priority, application Fed. Rep. of Germany, Sep. 19, 1989, 8911282[U]
Int. Cl.[5] B41F *35/02*
U.S. Cl. 101—425 8 Claims




1. A device for cleaning a cylindrical stencil comprising two cylindrical brushes rotatably mounted in a tub along the tub's longitudinal axis, said stencil resting on said brushes during the cleaning process, and means pivotally mounting said tub about a horizontal axis transverse to said longitudinal axis to tilt said tub with respect to the horizontal axis during the cleaning process.

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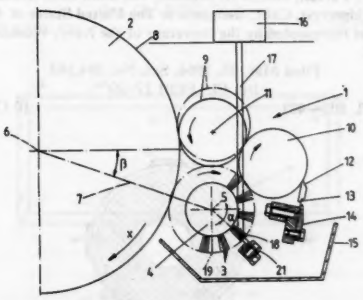
5,035,178

## WASHING DEVICE FOR CLEANING A CYLINDER OF A PRINTING MACHINE

Hans-Georg Jahn, Wiesenbach; Hermann Beisel, Walldorf, and Karl-Heinz Seefried, Zuzenhausen, all of Fed. Rep. of Germany, assignors to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Filed Mar. 26, 1990, Ser. No. 499,028
Claims priority, application Fed. Rep. of Germany, Mar. 24, 1989, 3909819
Int. Cl.[5] B41F *35/00*; B41L *41/00*
U.S. Cl. 101—425 11 Claims




1. Washing device for cleaning a cylinder of a printing machine, comprising a brush roller formed with bristles and rotatably driven about an axis, said brush roller cooperatively engaging the cylinder, and a deflection element disposed adjacent said bristles, fixed in position relative to said brush roller and extending along the length of said brush roller, said bristles yieldingly brushing against said deflection element as said

brush roller is rotated so as to be bent temporarily and subsequently returned to a straight extended position thereof, said deflection element being formed as a distributor pipe connected to a source of washing fluid and having outlet openings formed therein, said outlet openings being oriented to direct the washing fluid radially towards said axis of said brush roller.

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**5,035,179**

## PROCESS FOR COVERING A TUBE WITH A FOIL, AND AN IGNITER ELEMENT PRODUCED BY SAID PROCESS

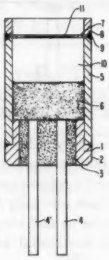
**Richard Bender, Lauf, and Anton Bretfeld, Furth, both of Fed. Rep. of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Fed. Rep. of Germany**

**Filed Jun. 18, 1990, Ser. No. 539,449**

**Claims priority, application Fed. Rep. of Germany, Jun. 22, 1989, 3920402**

**Int. Cl.[5] F42C *19/10***

**U.S. Cl. 102—202.5** **6 Claims**



1. An igniter element, comprising a metal cylindrical casing containing a primer charge and covered with a metal foil, characterized in that the cylindrical casing is extended by a metal tube section having a cross-section similar or identical to that of the cylindrical casing; the foil is inserted between the casing and the tube section; the casing and the tube section are butt-welded only on their sides, rather than in the entire wall thickness cross-section, so that the root of the weld seam nowhere reaches up to the inner wall of the casing or of the tube section.

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**5,035,180**

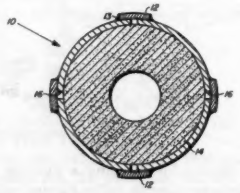
## SHEARING TYPE ORDNANCE VENTING DEVICE

**Nick L. Purcell; Joseph A. Schmidt, and John A. O'Malley, all of Ridgecrest, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Mar. 28, 1984, Ser. No. 594,142**

**Int. Cl.[5] F42B *39/00***

**U.S. Cl. 102—481** **10 Claims**



1. An ordnance venting system to reduce the danger of explosion from an ordnance item subjected to a fire comprising:

an ordnance item having a cylindrical casing of a material having predetermined thermal expansion characteristics and a plurality of holes extending through the cylindrical walls of said casing;

a metallic patch having different thermal expansion properties than said casing material covering each of said plurality of holes; and

means for attaching said patch to said cylindrical casing for ambient temperature ranges, said attaching means having a shear strength less than the shear force produced by heating said patch and casing to predetermined temperatures corresponding to external fire threats.

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**5,035,181**

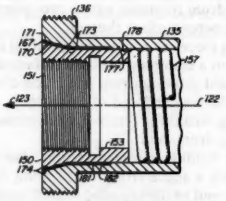
## THERMOSENSITIVE POP-OUT DEVICE

**Donald J. Jacks; Clayton E. Panlaqui; Raymond E. Boss, all of Ridgecrest, Calif., and Edwin Gaunt, Inyokern, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Jan. 22, 1985, Ser. No. 693,633**

**Int. Cl.[5] F42B *39/00***

**U.S. Cl. 102—481** **6 Claims**



1. A thermosensitive pop-out device for use in an ordnance item having a casing, an opening defined by the casing, a charge which is subject to cook-off within the casing, and a fuze extended centrally of the opening for desired initiation of the charge, the device comprising:

an inner sleeve configured to circumscribe the fuze and bearing a first retaining surface;

means for fixedly connecting the inner sleeve and the fuze;

an outer sleeve circumscribing the inner sleeve and configured for reception in said opening, the outer sleeve being slideably related to the inner sleeve for movement of the inner sleeve together with a fuze fixed thereto in a path from the casing, and the outer sleeve bearing a second retaining surface conforming to the first retaining surface, the second retaining surface being disposed for juxtapositioned relation to the first retaining surface when a fuze fixed to the inner sleeve is disposed to initiate the charge and being disposed for separation from the first retaining surface when the inner sleeve begins such movement;

means for fixedly connecting the outer sleeve and the casing;

a pair of conforming alignment surfaces borne individually by the sleeves and spaced from the retaining surfaces in a direction along said path;

motivating means for urging the inner sleeve along said path;

means disposed in a layer between said retaining surfaces for retaining the inner sleeve to the outer sleeve against said urging at predetermined normal temperature and for releasing the inner sleeve from the outer sleeve at a predetermined higher temperature so that the inner sleeve is moved along said path by the motivating means to carry a fuze fixed to the inner sleeve from the charge to avoid cook-off thereof, said means disposed in a layer being in a flowable state when initially disposed therein; and

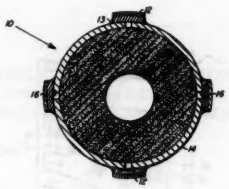
each sleeve having a surface portion extending between the retaining surface and the alignment surface of said sleeve and facing said surface portion of the other sleeve, said surface portions of the sleeves being disposed in a spaced relation transversely of said path so that said material in said flowable state which flows from between the retaining surfaces onto said surface portion does not retain the sleeves together thereat.

5,035,182

## BENDING TYPE ORDNANCE VENTING DEVICE

Nick L. Purcell; Joseph A. Schmidt, and John A. O'Malley, all of Ridgecrest, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 28, 1984, Ser. No. 594,143
Int. Cl.[5] F42B 39/00
U.S. Cl. 102—481 4 Claims



1. An ordnance venting system to reduce the danger of explosion from an ordnance item subjected to a fire comprising:

a cylindrical casing having a plurality of spaced-apart holes in said cylindrical casing;

a bimetallic patch adjacent said casing, covering each of said plurality of holes; and

means for attaching said patch to said casing.

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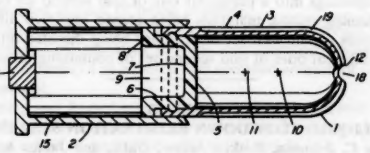
5,035,183

## FRANGIBLE NONLETHAL PROJECTILE

David Luxton, 2311 Nerta Street, Ottawa, Canada K1G 1E6

Filed Mar. 12, 1990, Ser. No. 491,697
Int. Cl.[5] F42B 8/14
U.S. Cl. 102—502 6 Claims



1. A two-piece cylindrical projectile for firing from a firearm by a propellant-charged cartridge, such projectile comprising:

(a) an aerodynamically shaped thin-walled, frangible cap portion having:

(i) a closed nose end carrying a free-flowing filling;

(ii) an open base end; and

(iii) a surrounding wall that is sufficiently strong to sustain loading and firing, but sufficiently frangible to burst on impact without causing lethal injury, the wall of the cap portion being provided with multiple longitudinal scoring lines which close radially at the nose end and terminate centrally on said nose end with a region wherein the cap wall is relatively reduced in thickness with respect to the wall thickness between the longitudinal scoring lines; and

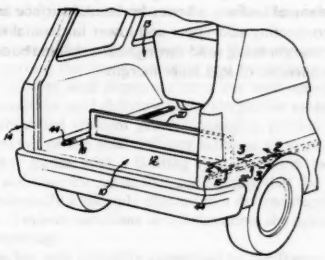
(b) a plug portion of cylindrical proportions, sealingly installed and protruding into the base end of said cap portion, said plug portion being provided with a cylindrical wall to contain the expansive effect of propellant gases on firing, and being provided with an interior cavity within such cylindrical wall, the cavity being of a dimension that causes the center of gravity of the projectile to be displaced forwardly of the geometric, longitudinal midpoint of the projectile.

5,035,184

## CARGO RESTRAINT SYSTEM

John A. Bott, 931 Lakeshore Dr., Grosse Pointe Shores, Mich. 48236

Continuation of Ser. No. 251,033, Sep. 26, 1988, abandoned, which is a continuation of Ser. No. 21,778, Mar. 4, 1987, abandoned. This application Mar. 19, 1990, Ser. No. 496,115
Int. Cl.[5] B60P 7/135
U.S. Cl. 104—121 15 Claims



1. A cargo restraint for a vehicle comprising:

positioning means adapted to be fixedly secured to a vehicle surface for enabling selectable, slidable positioning of said cargo restraint above said surface; and a planar wall member for restraining movement of cargo on said vehicle surface, said wall member having a pair of opposite lateral edges and being movable from a retracted, nonrestraining, first position wherein the wall is substantially parallel to the vehicle surface and adjacent said positioning means to a restraining second position wherein said wall is substantially perpendicular to the vehicle surface for restraining cargo movement; and slider means disengageably associated with said positioning means, said slider means including a resilient bracket pivotally connected to each of said lateral edges of said wall member and said slider means and disposed for movement in a plane substantially perpendicular to said wall member, said bracket including means to allow said wall member to pivot toward said slider means for said first position.

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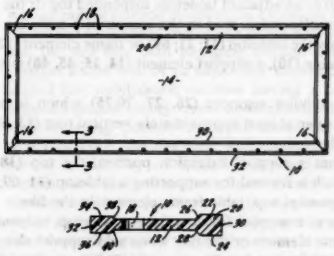
5,035,185

## OUTLET GATE PAN GASKET FOR HOPPER CARS

Francis R. Schultz, Woodridge, Ill., assignor to Salco Products Inc., Romeoville, Ill.

Filed Mar. 27, 1990, Ser. No. 499,709
Int. Cl.[5] B65D 53/00
U.S. Cl. 105—424 10 Claims



1. In a hopper car of the type having a bottom wall, the bottom wall having at least one outlet flange which defines an outlet aperture in the bottom wall, an outlet gate having a gate flange generally matching the contour of the outlet flange and attached to the underside of the outlet flange, the outlet gate

including a moveable cover for selectively opening and closing the outlet aperture, the improvement comprising a flexible gate gasket disposable between the outlet flange and the gate flange, the gasket including a central web which defines a closed plane figure shaped so as to generally surround the contour of the outlet aperture, an inner margin attached to the inner periphery of the web and an outer margin attached to the outer periphery of the web, the inner margin having an uncompressed thickness greater than that of the web and the outer margin, said inner margin having outer surfaces including an upper horizontal surface, a lower horizontal surface and edge surfaces connecting said upper and lower horizontal surfaces, said inner margin being solid throughout a volume bounded by said outer surfaces of said inner margin.

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**5,035,186**

## TABLE HAVING A CONNECTION DEVICE

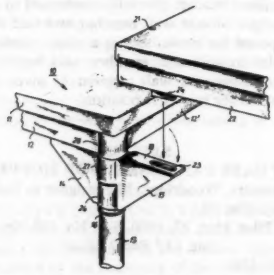
**Claus Uredat, Lindern, and Wolfgang Ritter, Stuttgart, both of Fed. Rep. of Germany, assignors to Röder GmbH Sitzmöbelwerke, Frankfurt, Fed. Rep. of Germany**

**Filed Mar. 3, 1989, Ser. No. 319,149**

**Claims priority, application Fed. Rep. of Germany, Mar. 5, 1988, 8802990[U]; Jul. 29, 1988, 8809657[U]**

**Int. Cl.[5] A47B *3/06***

**U.S. Cl. 108—159** **28 Claims**



1. A table having a connection device for connecting the table (10) to an adjacent tabletop, suspended top or the like (21; 37), characterized in that in the region of a table leg (13; 60) and below the tabletop (11; 21; 69) or frame element (12; 22; 47) of said table (10), a support element (14, 15; 45, 46) is provided that

has a tubular segment (26, 27; 70,75) which is pivotable about an at least approximately vertical part (13; 63) of the table,

also has a support extension portion, the top (18; 50) of which is formed for supporting a tabletop (11; 69; 21; 37), suspended top, table frame element or the like,

serves as a support for an adjacent tabletop, suspended top, frame element or the like when said support element is in a position outwardly pivoted (15′ 5″) about said at least approximately vertical part (13; 62) of the table, and

is provided with a releasable, upwardly protruding part (54) for engagement in a corresponding recess (44) of the tabletop, suspended top, or frame element which is to be connected to said support element.

**5,035,187**

## SAFE WITH COLOR-CODED DRAWERS EMPTYING INTO COLOR-CODED CONTAINERS

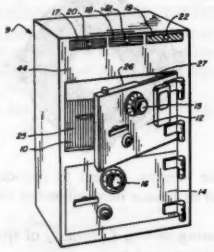
**Edward T. McGunn, Indian Head Park, Ill., assignor to McGunn Safe, Inc., Chicago, Ill.**

**Continuation of Ser. No. 253,040, Oct. 4, 1988, Pat. No. 4,922,837. This application May 1, 1990, Ser. No. 517,374**

**The portion of the term of this patent subsequent to May 8, 2007, has been disclaimed.**

**Int. Cl.[5] E05G *1/00***

**U.S. Cl. 109—46** **18 Claims**



1. A safe for multiple users comprising:

(A) an enclosure with a first set of a plurality of openings;

(B) a second set of a plurality of containing means, with said second set being contained within said enclosure;

(C) a further opening in said enclosure of a size to permit the removal of the contents of said containing means;

(D) locking means for preventing the unauthorized access to said containing means or the removal of the contents of said containing means from said enclosure; and

(E) guiding means, coupled to said first set of said plurality of openings and to said second set of containing means, for directing material in a particular one of said first set of openings into a particular one of said second set of containing means, materials being placed into two different ones of said first set of openings being directed into two different ones of said second set of containing means.

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**5,035,188**

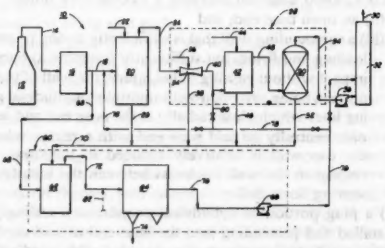
## LIQUID BLOWDOWN ELIMINATION SYSTEM

**Bruce C. Johnson, Broken Arrow, Okla., and James A. Newburn, Knoxville, Tenn., assignors to IT-McGill Pollution Control Systems, Inc., Tulsa, Okla.**

**Filed Sep. 11, 1990, Ser. No. 580,773**

**Int. Cl.[5] F23J *11/00***

**U.S. Cl. 110—345** **24 Claims**



1. In an incinerator system in which a flue gas stream is subjected to a wet scrubber system or the like to recover particulate matter and/or acid gases contained in a main flue gas stream and in which is produced a liquid bottom stream and an exhaust overhead flue gas stream, the improvement comprising the steps of:

(a) removing a flue gas slipstream from the main flue gas stream;
(b) combining the flue gas slipstream with a liquid blowdown stream to evaporate the liquid constituent of the liquid blowdown stream and produce a dry effluent slipstream;
(c) removing residual particulates from the dry effluent slipstream to produce a substantially solids-free flue gas slipstream; and
(d) exhausting the substantially solids-free flue gas slipstream.

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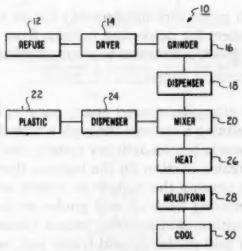
**5,035,189**
**REFUSE RECYCLING SYSTEM**
**T. J. Lunsford, 11668 Hi Ridge Rd., Lakeside, Calif. 92040**
**Filed Aug. 3, 1990, Ser. No. 562,681**
**Int. Cl.[5] F23G *5/04***
**U.S. Cl. 110—346** **6 Claims**




1. A process for recycling refuse, comprising providing a specified amount of refuse material;
providing a specified amount of plastic material;
mixing said specified amount of plastic material with said specified amount of refuse material;
heating and mixture of refuse and plastic materials to a temperature sufficient to melt said specified amount of plastic material to envelop said specified amount of refuse material;
molding said heated mixture into a desired shape; and
cooling said mixture to solidify said plastic for encapsulating said refuse to produce a solid useful article.

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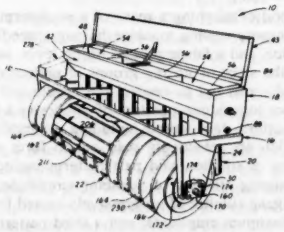
**5,035,190**
**IMPLEMENT FOR SEEDING GRASS**
**Charles I. Grimes, Rt. 1, Box 56, Hennessey, Okla. 73742**
**Filed Nov. 17, 1989, Ser. No. 438,519**
**Int. Cl.[5] A01C *5/06, 7/12, 7/18;* A01B *29/00***
**U.S. Cl. 111—195** **11 Claims**



1. An implement for seeding grass comprising:
a frame assembly having a forwardly extending end portion connectable to a towing vehicle;
a seed box supported on the frame assembly, the seed box defining a plurality of seed compartments, each of the seed compartments having a seed dispensing slot in a lower portion thereof;
seed delivery tubes connected to the seed box such that each of the seed delivery tubes encompasses one seed dispensing slot;
picker wheel means rotatably supported in the seed dispensing slots for selectively removing seed from each of the seed compartments;
directional flow agitator means rotatably mounted in the seed box for agitating and directing seed toward the seed dispensing slots and into contact with the picker wheel means;
packer means rotatably connected to the frame assembly for supporting the frame assembly and for firming soil over and around seed dispensed from the seed compartments through the seed delivery tubes, the packer means having a substantial resilient ground engaging portion disposed rearward of the seed delivery tubes so as to provide the packer means with a floating type motion as same firms the soil over the seeds thereby insuring that the seeds are substantially uniformly planted to a desired depth regardless of minor variations in soil elevation, the packer means comprising:
a packer axle rotatably connected to the frame assembly such that the packer axle is disposed in a substantially perpendicularly, spatial relationship with the seed delivery tubes;
a cylindrically shaped packer casing supported by the packer axle, the cylindrically shaped packer casing having a first end, an opposed second end and an outer surface;
a plurality of tires having hollow, non-inflated interior portions disposed on the packer casing; and
means for securing the tires on the packer casing comprising:
a plurality of spatially disposed rod members secured to the outer surface of the packer casing so as to be substantially parallel to the elongated central axis of the packer casing, each of the rod members having a first end and an opposed second end, each of the rod members having a length less than the length of the packer casing;
rod extension members connected to the first and second ends of each of the rod members such that the extension members are spatially disposed relative to the packer casing;
a first tire stabilization member having a centrally disposed packer casing receiving bore and a tire side wall engaging portion disposed about the packer casing receiving bore, the tire side wall engaging portion having a plurality of spatially disposed apertures therein such that when the first tire stabilization member is slidably positioned on the first end of the packer casing each of the apertures in the tire side wall engaging portion receives the extension member connected to the first end of one of the rod members and the tire side wall engaging portion abuttingly engages a side wall of an adjacently disposed tire;
a second tire stabilization member having a centrally disposed packer casing receiving bore and a tire side wall engaging portion disposed about the casing receiving bore, the tire side wall engaging portion having a plurality of spatially disposed apertures therein such that when the second tire stabilization member is slidably positioned on the opposed second end of the packer casing each of the apertures in the tire side wall engaging portion receives the extension member connected to the second end of one of the rod members and the tire side will engaging portion abuttingly engages a side wall of an adjacently disposed tire; and
connector means for connecting the first and second tire stabilization members to the extension members; and
drive means for operably connecting the packer means to

the directional flow agitator means and to the picker wheel means such that when the packer means is rotated rotational movement is imparted to the directional flow agitator means and to the picker wheel means and seed is uniformly discharged from the seed compartments via the seed dispensing slots and the picker wheel means into the seed delivery tubes.

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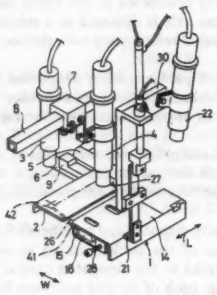
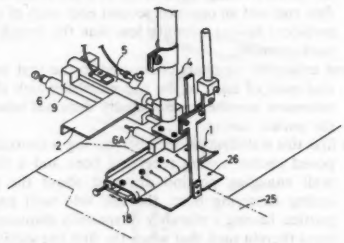
**5,035,191**

## CLOTH HOLDER FOR AUTOMATIC SEWING MACHINE

**Ryuiti Yokoyama, Toyonaka, Japan, assignor to Yamato Mishin Seizo Kabushiki Kaisha, Osaka, Japan**

**Filed Nov. 30, 1989, Ser. No. 443,199**
**Claims priority, application Japan, Nov. 30, 1988, 63-304569**
**Int. Cl.[5] D05B *3/12***
**U.S. Cl. 112—104** **6 Claims**





1. A patterned cloth holding apparatus for an automatic sewing machine, which apparatus comprises:

a cloth holder for holding a generally rectangular piece of fabric at a first location spaced from a second location where said piece of fabric is to be sewed on a cloth having a patterned right face, said piece of fabric having a patterned right face, respective patterns on said piece of fabric and said cloth being, when said piece of fabric is held by said cloth holder, oriented upwards;

first and second marking lamp means for illuminating a point in an area comprising left and right and front and rear portions of said piece of fabric and a point in an area comprising left and right and front and rear portions of said cloth, respectively, so that the patterns on the respective right faces of said cloth and said piece of fabric can be aligned with each other; and

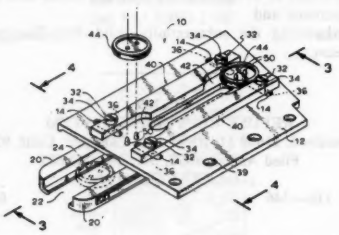
a holder device for rotating said cloth holder about an axis of rotation to transport said piece of fabric toward said second position where said piece of fabric is sewed on said cloth.

**5,035,192**

## BUTTON GUIDE TURNING ASSEMBLY

**Morris Nirenberg, N. Woodmere, and Jerry Tucci, Carle Place, both of N.Y., assignors to RASI Corporation, Oceanside, N.Y.**

**Filed Jul. 16, 1990, Ser. No. 553,868**
**Int. Cl.[5] D05B *3/22***
**U.S. Cl. 112—110** **9 Claims**



1. In a button guide turning assembly for an automatic button delivery system for delivering buttons from a button supply serially in a given orientation to a button affixing apparatus, comprising:

(A) a frame;

(B) a pair of elongate, spaced apart, parallel button guides together defining a channel through which the button pass in the automatic button delivery system, one of said guides exerting greater friction on the buttons than the other of said guides causing the buttons to rotate; and

(C) means securing each of said guides to said frame in a selected position, said securing means releasably securing said one of said guides to said frame and, when released, enabling repositioning of said one guide relative to said frame to a different selected position;

the improvement wherein said assembly additionally comprises:

(D) a pair of elongate, spaced apart, parallel calibration means together defining at least one button-receiving area, each calibration means being secured to a respective one of said guides for movement as a unit therewith, said calibration means being configured and dimensioned such that, when both of said calibration means abut a button in said at least one button-receiving area, said guides are appropriately positioned to pass buttons of like diameter through said channel with an appropriate clearance.

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**5,035,193**

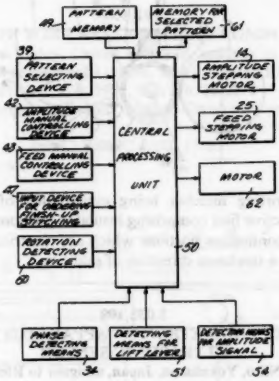
## CONTINUOUS HEM STITCHING SEWING MACHINE

**Susumu Hanyu, Tokyo, Japan, assignor to Janome Sewing Machine Co. Ltd., Tokyo, Japan**

**Filed Sep. 27, 1988, Ser. No. 249,851**
**Claims priority, application Japan, Oct. 7, 1987, 62-251667**
**Int. Cl.[5] D05B *3/02***
**U.S. Cl. 112—266.1** **2 Claims**

2. A method of stitching a mark of a predetermined shape onto a fabric on a sewing machine having a needle, a fabric feeding device, and a fabric presser lifting lever, said method comprising the steps of storing groups of pattern data which are selectively read out to control the needle and the fabric feeding device to produce a pattern of stitches on a fabric, said groups of pattern data stored including a plurality of part patterns which are selectively read out to form a complete single pattern of stitches, said part patterns including a first pattern of zigzag stitches of constant amplitude, a second pattern of zigzag stitches of progressively varied from a minimum to a maximum amplitude, and a third pattern of zigzag stitches of progressively varied from a maximum to a minimum amplitude; reading out said first, second and third stitch patterns; detecting each needle position of said first stitch pattern, generating an ON signal for selection of any of said second and third stitch patterns, and cancelling the ON signal when one of

said second and third stitch patterns is selected thereby establishing a selected stitch pattern, to thereby nullify the selection of the other stitch patterns while the selected stitch pattern is stitched; detecting a lift of said fabric presser lifting lever for



turning the fabric relative to said needle and detecting a fall of said fabric presser lever to thereby allow the selected stitch pattern to be stitched, said selected stitch pattern being programed to be followed by said first stitch pattern.

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**5,035,194**

**FORCED FOIL SAIL**

**Patrick S. Dougherty, P.O. Box 798, Hood River, Oreg. 97031**

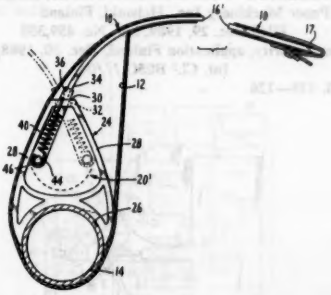
**Filed May 3, 1990, Ser. No. 518,180**

**Int. Cl.[5] B63H** *9/08*

**U.S. Cl. 114—102** **12 Claims**

**10**. An improved camber induced sail of the type which is mounted on a mast, has one or more battens for stiffening the sail to have a wing shape, and with respect to one or more of the battens, a separate camber inducer for each such batten for pivotally coupling it at one end to the mast, and a separate batten restraining strap for each such batten for applying an axially compressive force at the aftward end of the batten to force the batten toward the camber inducer and thereby cause the batten to bow to a desired degree, wherein the improvement is in the camber inducer which comprises:

a resilient coupling for pivotally connecting the forward end of a batten to the mast to allow the forward end of the batten to rotate about the mast while simultaneously applying an aftward force along the longitudinal axis of the batten and wherein each coupling comprises one or more




tension springs connected between the coupling and the forward end of the batten.

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**5,035,195**

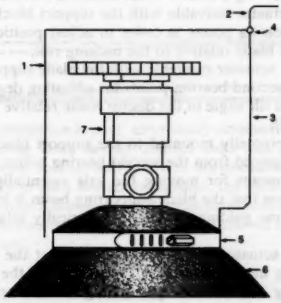
**VALVE SHUT-OFF FLAG**

**Franklin Wille, 123 Maple Dr., Knollwood East, Mankato, Minn. 56001**

**Filed Jun. 18, 1990, Ser. No. 539,438**

**Int. Cl.[5] F16K** *37/00*; **F16P** *3/08*

**U.S. Cl. 116—277** **8 Claims**




**1**. An apparatus for indicating an open or closed position of a valve, said valve protruding from a tank primarily along a first axis, comprising:

a first member extending in a direction essentially parallel to said first axis,

a flexible means for interconnecting said first member to a second member,

said second member having a first surface and a second surface,

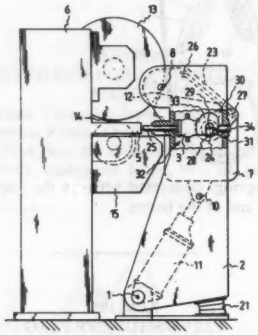
said second member being pivotable with respect to said first member, wherein said first surface of said second member pivots from extending in a first direction essentially parallel to said valve to extending in a second direction essentially perpendicular to said axis, said second surface of said second member being substantially parallel to said first member and radially opposite of said valve relative to said first member when said first surface of said second member is perpendicular to said axis, said second surface of said second member having a dimension in a direction parallel to said axis substantially similar to a corresponding dimension of said first member.

5,035,196

## APPARATUS FOR CONTROLLING THE TILT ANGLE OF A DOCTOR BLADE

Aaron Mannio, Järvenpää 050351550, Finland, assignor to Valmet Paper Machinery Inc., Helsinki, Finland

Filed Dec. 29, 1989, Ser. No. 459,359
Claims priority, application Finland, Dec. 30, 1988, 886062
Int. Cl.[5] B05C *11/04*
U.S. Cl. 118—126 6 Claims



1. An apparatus for controlling tilt angle of a doctor blade relative to a backing roll, the apparatus comprising:

two support blocks pivotally mounted on a base about first bearing points;

a doctor blade supporting beam pivotally mounted to an upper part of the support blocks, the blade supporting beam having a doctor blade attached thereto;

a first actuator movable with the support blocks about the first bearing points in order to adjust positioning of the doctor blade relative to the backing roll;

a second actuator rotatable with the blade supporting beam about second bearing points for adjusting degree of loading and tilt angle of the doctor blade relative to the backing roll;

an axle pivotally mounted to the support blocks, the axle being spaced from the second bearing points;

transfer means for moving the axle essentially in a same direction that the blade supporting beam is moved; and

at least one guiding member eccentrically attached to the axle,

the first actuator being positioned against the at least one guiding member whereby eccentricity of the at least one guiding member causes pivoting of the support blocks about the first bearing points when the blade supporting beam is pivoted about the second bearing points by the second actuator.

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5,035,197

## DEVELOPING DEVICE

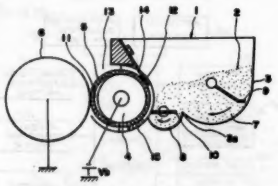
Yuji Enoguchi; Toshiya Natsuhara, and Hiroshi Mizuno, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jul. 13, 1989, Ser. No. 379,554
Claims priority, application Japan, Jul. 14, 1988, 63-176155; Aug. 1, 1988, 63-192390
Int. Cl.[5] G03G *15/06*
U.S. Cl. 118—647 7 Claims

1. A developing device disposed adjacent to a rotatably arranged photoreceptor, which comprises:

a rotatably disposed actuating roller confronting said photoreceptor, said actuating roller being conductive; and

a toner transporting member formed of a flexible member and having a peripheral length longer than that of said actuating roller and loosely mounted thereover in order to form a slack of the flexible member at least at a location confronting said photoreceptor so that said slack of the flexible member contacts with the surface of the photoreceptor while keeping a part of the flexible member substantially in contact with said actuating roller, said toner



transporting member being constructed of electrically conductive film comprising insulated portions and electrically continuous portions which are electrically continuous in a thickness direction of said film.

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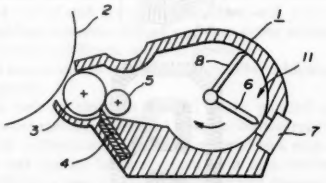
5,035,198

## TONER END DETECTION APPARATUS USING ULTRASONIC SENSOR

Yoshiharu Niito, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Apr. 18, 1990, Ser. No. 510,613
Claims priority, application Japan, Apr. 21, 1989, 1-103075
Int. Cl.[5] G03G *21/00*
U.S. Cl. 118—653 10 Claims



1. A toner end detection apparatus comprising:

a toner tank which accommodates a toner;

an agitator which is rotatably provided within said toner tank for uniformly distributing the toner within said toner tank;

a motor for rotating said agitator;

detecting means for detecting a rotational state of said motor and for outputting a detection signal dependent on the detected rotational state;

a toner detection sensor which has a surface exposed within said toner tank and outputs a detection signal, said toner detection sensor being made up of an ultrasonic sensor which oscillates at a predetermined frequency when no toner is adhered on said surface;

setting means for variably setting a set value;

measuring means for measuring an oscillation time of said toner detection sensor in response to the output detection signal of said toner detection sensor;

discriminating means for discriminating a toner end based on a comparison of the set value which is set by said setting means and the oscillation time which is measured by said measuring means, said toner accommodated within said toner tank being less than a predetermined quantity when the toner end is detected; and

clearing means responsive to the detection signal output from said detecting means for clearing the set value set by said setting means when activated, said clearing means being activated immediately when said detecting means detects no rotation of said motor and activated at least

after one revolution of said agitator when said detecting means detects rotation of said motor,

said discriminating means detecting the toner end when the measured oscillation time is greater than or equal to the set value N consecutive times, where N is an integer.

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**5,035,199**

## APPLICATOR FOR CREASE SETTING COMPOSITION

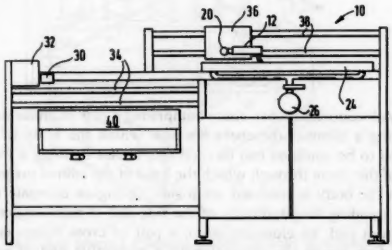
**Paul Hageman, Ilkley, United Kingdom, assignor to Wool Development International Limited, Ilkley, United Kingdom**

**Filed Jun. 8, 1989, Ser. No. 363,092**

**Claims priority, application United Kingdom, Jun. 9, 1988, 8813673**

**Int. Cl.[5] B05C** *5/00, 13/02*

**U.S. Cl. 118—681** **8 Claims**




1. An applicator for applying a crease setting composition to a plurality of parallel creases on a fabric panel having a first edge and a second edge, comprising:

stationary means for gripping said fabric panel and holding it stationary while crease setting composition is applied;

at least two applicator heads mounted over said means for gripping said fabric panel, said heads being subjected to acuation for dispensing said composition;

moving means for raising and lowering said applicator heads and for translating said heads forward and backwards along said gripping means;

means for sensing said first edge, said moving means lowering said head to said fabric panel in response to detection of said first edge, and translating said heads from said first edge to said second edge;

means for actuating said heads to dispense said composition during said translation between said first and said second edges;

means for sensing said second edge and discontinuing said dispensing when said second edge is detected.

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**5,035,200**

## PROCESSING LIQUID SUPPLY UNIT

**Masashi Moriyama, Tokorozawa; Yutaka Yamahira, and Yuji Matsuyama, both of Kumamoto, all of Japan, assignors to Tokyo Electron Limited, Tokyo and Tel Kyushu Limited, Kumamoto, both of, Japan**

**Continuation of Ser. No. 360,545, Jun. 2, 1989, abandoned. This application Sep. 5, 1990, Ser. No. 579,251**

**Claims priority, application Japan, Jun. 3, 1988, 63-137927**

**Int. Cl.[5] B01F** *3/04*

**U.S. Cl. 118—693** **12 Claims**

1. A processing liquid supply unit for supplying a processing liquid to an object to be processed in a clean room, said unit comprising:

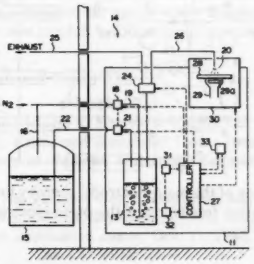
a reserve tank, for reserving a processing liquid, located outside of said clean room;

a storing tank for storing said processing liquid supplied from said reserve tank;

detecting means for detecting the amount of the processing liquid stored in said storing tank;

refilling means for automatically refilling the processing liquid into said storing tank on the basis of detection signals from said detecting means;

processing liquid delivery means for delivering the processing liquid from said storing tank to an object to be processed; and




means for forming a resist film on said object, wherein said processing liquid is for forming said resist film on said object.

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**5,035,201**

## EVAPORATING BOAT HAVING PARALLEL INCLINED CAVITIES

**Edward D. Parent, Hamilton, Mass., and Oliver S. Smith, Stratham, N.H., assignors to GTE Products Corporation, Stamford, Conn.**

**Filed Dec. 28, 1990, Ser. No. 635,084**

**Int. Cl.[5] C23C** *14/24, 14/26*

**U.S. Cl. 118—726** **3 Claims**

1. A self-resistance-heated electrically-conductive refractory evaporating boat having contact ends and having an upper horizontal surface and a lower horizontal surface, an inclined cavity in each horizontal surface, the cavities having the same shape and dimensions and being parallel to each other so that the cross sectional area of the boat between the contact ends is constant.

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**5,035,202**

## FREQUENCY FINE-ADJUSTING APPARATUS FOR A PIEZO-ELECTRIC OSCILLATOR

**Yukio Nishikawa, Ikeda, and Yuji Uesugi, Osaka, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Apr. 11, 1990, Ser. No. 507,564**

**Claims priority, application Japan, Apr. 13, 1989, 1-93531**

**Int. Cl.[5] C23C** *16/00*

**U.S. Cl. 118—727** **6 Claims**

1. A frequency fine-adjusting apparatus for a piezo-electric oscillator having at least one main electrode, said apparatus comprising:

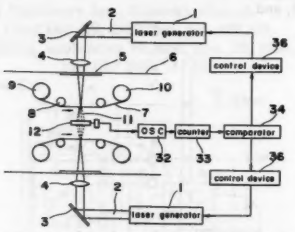
at least one laser beam generator for emitting a laser beam having a wavelength of 2 $\mu$m or less;

at least one target material having a metallic layer;

a target material feed means for feeding said target material relative to the piezo-electric oscillator in a condition in which said metallic layer confronts the main electrode of the piezo-electric oscillator and is spaced a predetermined length from the main electrode; and

at least one optical system for applying said laser beam to said metallic layer;

whereby, when said laser beam is applied to said metallic layer, part of said metallic layer is vaporized and adheres




to a surface of the main electrode, thereby finely adjusting an oscillation frequency of the piezo-electric oscillator.

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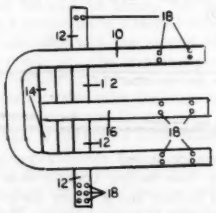
**5,035,203**

**PET AUTOMOBILE SAFETY HARNESS**

**David Cardenas, 94-976 A Hanavna St., Waipahu, Hi. 96797, assignor to David Cardenas, Pearl City, Hi.**

**Filed May 8, 1990, Ser. No. 521,189**
**Int. Cl.[5] A01K** *29/00*
**U.S. Cl. 119—96** **11 Claims**



1. A pet vehicle safety harness for use with a standard lap or three point seat belt, comprising:

(a) a body belt, said body belt being the main support securing the pet on both sides and front so that movement from left to right and forward is minimized, said body belt taking up most of the stress in the event of an accident or sudden stop of the vehicle, said body belt being removably mounted to the standard lap or the three point seat belt;

(b) an adjustable chest support securing the harness to the pet;

(c) adjusting means disposed on said chest support for adjusting said chest support for a proper fit of the harness on the pet;

(d) a back belt having a length and being removably mounted to the standard lap or the three point seat belt, said back belt traversing over the back of the pet, said back belt restricting movement of the pet, said back belt restricting movement of the pet by being disposed over the back of the pet thereby forcing the pet to remain in a seat or prove position, said back belt being one homogeneous piece;

(e) fastening means for removably attaching said back belt and said body belt to the standard lap or three point seat belt, said fastening means providing for quick release of the pet in case of an emergency; and

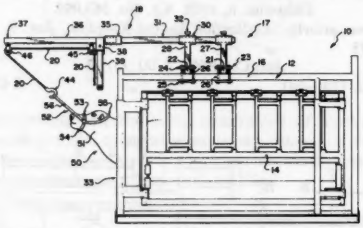
(f) a shoulder support secured to said body belt and said back belt.

**5,035,204**

**HEAD RESTRAINT FOR A LIVESTOCK SQUEEZE CHUTE**

**Doyle Knoss, Box 3, Rockglen, Saskatchewan, Canada, S0H 3R0**

**Filed Oct. 20, 1989, Ser. No. 424,599**
**Claims priority, application Canada, Dec. 6, 1988, 585095**
**Int. Cl.[5] A61D** *3/00*
**U.S. Cl. 119—99** **4 Claims**



1. A livestock squeeze chute comprising a pair of chute sides defining a channel therebetween into which the body of an animal to be confined can be received, means defining a front end of the chute through which the head of the animal projects when the body is confined, each side having an elongate top rail extending longitudinally of the side and at right angles to the front end, an elongate beam, a pair of cross beams each extending across the channel with a respective end of each cross beam attached to a respective one of said rails so as to be supported thereby, means mounting the elongate beam on the cross beams so that the elongate beam extends forwardly therefrom and is supported thereby in cantilever manner in order that a forwardmost end of the elongate beam is located forwardly of the front end, at a height above and substantially centrally of the front end of the chute, a winch, a support arm mounting the winch for actuation by an operator at the chute, the support arm being connected to the elongate beam at a position between the cross beams and the forwardmost end and extending therefrom forwardly and to one side thereof, the winch being mounted on an end of the support arm remote from the beam, the elongate beam having attachment means thereon for attachment of the support arm thereto in a first orientation so as to extend outwardly to one side of the front end and in a second orientation so as to extend outwardly to an opposed side of the front end, a cable having a free operating end and a captive end attached to the winch for winding thereon, and a pulley at the forwardmost end of the beam over which the cable passes such that the free end depends from the pulley and such that actuation of the winch causes the free end of the cable to be pulled forwardly and upwardly for applying force to a halter engaging the head of the animal, whereby the head of the animal in the chute is pulled upwardly and forwardly toward the pulley to subdue the animal.

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**5,035,205**

**COLLAPSIBLE DISPOSABLE CAT LITTER BOX**

**Philip Schiller, 256 Pepper Rd., Huntingdon Valley, Pa. 19006, and Michael Brick, 5 Lawrence St., Bloomfield, N.J. 07003**

**Filed Feb. 23, 1990, Ser. No. 484,155**
**Int. Cl.[5] A01K** *29/00*
**U.S. Cl. 119—168** **6 Claims**

1. A collapsible reclosable box, comprising:

(a) a generally rectangular bottom panel;

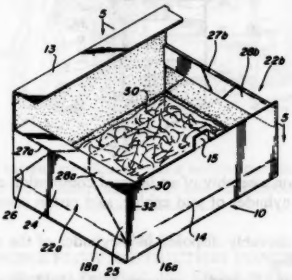
(b) a plurality of side walls extending upwardly from the edges of the bottom panel, the bottom panel and side walls forming an enclosure; and

(c) collapsible closure means extending from the side walls, including:

(i) a first top panel, extending from one of the side walls,

(ii) a second top panel, extending from the opposite side wall,

(iii) first and second foldable panels, extending from the side walls between the first and second top panels, and forming with the first and second top panels an upward extension of the side walls, the first and second foldable panels having score lines dividing each foldable panel into a front portion, a central portion, and a rear portion, the first and second foldable panels being substantially parallel to the bottom panel when folded, with the central portions folding inward on the enclosure, the first and second foldable panels further having score lines dividing each foldable panel into an upper and lower portion and constraining the upper portion of the




first and second foldable panels to fold downward on and overlap the lower portion of the first and second foldable panels, said upper portions extending substantially the entire width of said foldable panels and being in contact at respective ends with the adjacent side wall, thereby enhancing the rigidity of the collapsible closure means, and

(iv) a tongue of substantially the same width as the first top panel and extending therefrom for a sufficient distance to make the first top panel substantially longer than the second top panel, and so dimensioned as to be insertable in the space formed between the second top panel and the foldable panels when the collapsible closure means is folded to form a complete closure.

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**5,035,206**

## DUAL FUEL NATURAL GAS/DIESEL 2-STROKE ENGINE

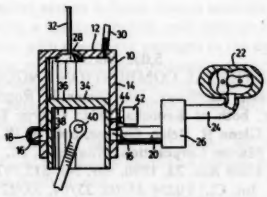
**Alan B. Welch; Raymond C. D. Skinner, both of Toronto, and Wendelin A. Goetz, Kitchener, all of Canada, assignors to Ortech Corporation, Ontario, Canada**

**Filed Jul. 5, 1990, Ser. No. 548,559**

**Claims priority, application United Kingdom, Jul. 4, 1989, 8915352**

**Int. Cl.[5] F02B *49/00***

**U.S. Cl. 123—27 GE** **12 Claims**




1. In a dual fuel, natural gas/diesel two-stroke engine having at least one cylinder, a piston in the cylinder, inlet port means around the cylinder to be uncovered by downward movement of the piston in the cylinder, air means for forcing air through said inlet port means when uncovered, an exhaust port and valve means for opening said exhaust port once each cycle to exhaust combustion gases from said cylinder, diesel injection means to inject diesel fuel into the cylinder once each cycle, and gas injection means for injecting natural gas into the cylinder once each cycle, the improvement according to which the gas injection means includes a delivery conduit for natural gas, which conduit opens into the cylinder at a location above said inlet port means, whereby the piston when descending completely uncovers said conduit before beginning to uncover said inlet port means.

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**5,035,207**

## COOLING SYSTEM FOR VEHICLE

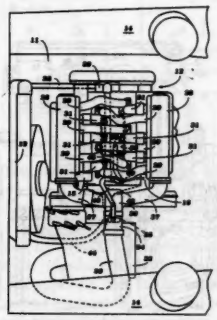
**Kenichi Sakurai, Kami, and Kazutoshi Ueda, Iwata, both of Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan**

**Division of Ser. No. 914,869, Oct. 3, 1986, Pat. No. 4,790,287. This application Oct. 24, 1988, Ser. No. 261,719**

**Claims priority, application Japan, Oct. 11, 1985, 60-226287**

**Int. Cl.[5] F01P *7/14***

**U.S. Cl. 123—41.1** **5 Claims**



1. A coolant passage system for a V-shaped internal combustion engine having a crankshaft, a radiator, and a pair of cylinder banks having respective coolant jackets defined therein, and a V-shaped space defined between said cylinder banks said system comprising a coolant pump disposed at one end of said cylinder banks in the direction of said crankshaft and delivering coolant into said coolant jackets at said one end of said engine from said radiator; a collecting conduit disposed on an opposite end of said cylinder banks for delivering the coolant from said coolant jackets to said radiator; a bypass pipe interconnecting said coolant pump and said collecting conduit and disposed in said V-shaped space.

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**5,035,208**

## METHOD AND DEVICE FOR WINTERIZING BOAT ENGINES

**Edwin C. Culp, 9 Severn Dr., Annapolis, Md. 21401**

**Filed Jul. 17, 1989, Ser. No. 380,440**

**Int. Cl.[5] F01P *11/02***

**U.S. Cl. 123—41.14** **18 Claims**

1. A device for winterizing boat engines with an intake port, comprising:

(a) a source of flushing liquid;

(b) a means for regulating the flow of the flushing liquid at said source;

(c) a container for holding antifreeze at a higher elevation than the engine to be winterized;

(d) a first stop cock fixed to the base of said container for regulating flow of antifreeze out of the container;

(e) a "Y" valve having two arms and a common duct;

(f) a hose connecting said first stop cock to one arm of "Y" valve;
(g) a hose connecting the source of flushing liquid to the other arm of the "Y" valve;
(h) additional stop cocks on each arm of the "Y" valve to regulate the flow through each arm independently;
(i) a hose means adapted to connect the common duct of the "Y" valve to the intake port of the engine to be winterized.

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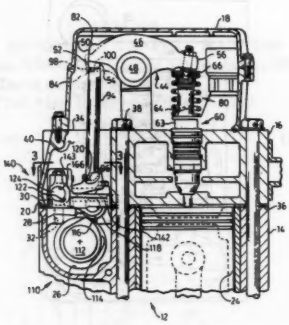
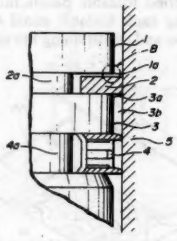
**5,035,209**
**RETENTION SHELF FOR AN ENGINE**
**Brent L. Braker, Morton, and J. Barry Heisey, Chillicothe, both of Ill., assignors to Caterpillar Inc., Peoria, Ill.**
**Filed Sep. 21, 1990, Ser. No. 586,345**
**Int. Cl.[5] F01L *1/14***
**U.S. Cl. 123—90.61** **19 Claims**



1. An engine having a retention shelf, comprising:
a cylinder block having a longitudinally disposed through bore intermediate a top and bottom mounting surface and a plurality of openings therein extending at least partially between the top and bottom mounting surfaces, said plurality of openings being substantially in line and intersecting with the through bore in the block;
a cylinder head attached to the cylinder block;
a rocker arm pivotally mounted to the cylinder head and having a first end, said first end being movable between a first operating position and a second operating position;
means for biasing the first end of the rocker arm from the first operating position to the second operating position;
a pushrod being normally in contact with the first end of the rocker arm;
means for reciprocating the pushrod and moving the first end of the rocker arm from the second operating position to the first operating position, said reciprocating means being partially positioned in the openings in the cylinder block; and
a retention shelf assembly in which potential damage to the engine, caused by the pushrod, can be prevented should said biasing means fail to move the first end of the rocker arm to the second operating position, said retention shelf assembly including at least one retention shelf assembly having a generally rectangular body and being positioned intermediate at least a portion of the means for reciprocating and the means for biasing and said retention shelf assembly at least partially filling the openings and being removably attached to the cylinder block.

**5,035,210**
**PISTON ASSEMBLY OF INTERNAL COMBUSTION ENGINE**
**Takayuki Arai, Yokosuka; Takaharu Goto, Yokohama, and Kyugo Hamai, Yokosuka, all of Japan, assignors to Nissan Motor Co., Ltd., Japan**
**Filed Jul. 25, 1990, Ser. No. 557,081**
**Claims priority, application Japan, Jul. 31, 1989, 1-196944**
**Int. Cl.[5] F02F *3/00***
**U.S. Cl. 123—193 P** **6 Claims**



1. A piston assembly of an internal combustion engine, disposed in a cylinder of said engine, said piston assembly comprising:
a piston movably disposed in a cylinder of the engine and including,
a top land formed at an upper part of said piston, said top land having a first chamfered surface at a lower peripheral edge thereof, and
a second land formed under said top land, said second land having a second chamfered surface at an upper peripheral edge thereof, said second chamfered surface having a width larger than a width of said first chamfered surface, both widths being measured a radial direction of the piston, said top and second lands defining a compression ring groove therebetween; and
a compression ring disposed in said compression ring groove to be slidably contacted with said cylinder, said compression ring having opposed end surface defining a gap.

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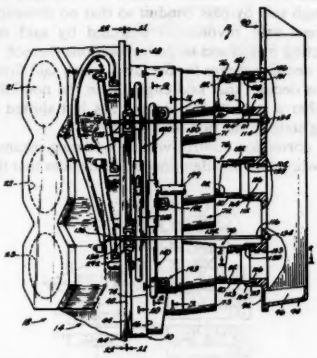
**5,035,211**
**INTERNAL COMBUSTION ENGINE**
**David W. Mate, McHenry, Ill.; Duane E. Rogers; Henry C. Billingsley, both of Kenosha, Wis.; George L. Broughton, Zion, and Glenn R. Belec, Gurnee, both of Ill., assignors to Outboard Marine Corporation, Waukegan, Ill.**
**Filed Apr. 23, 1990, Ser. No. 512,797**
**Int. Cl.[5] F02M *35/00, 35/04, 35/12***
**U.S. Cl. 123—198 E** **46 Claims**

1. An internal combustion engine comprising an engine block including a cylinder and a combustion air passage for supplying combustion air to said cylinder, an air silencer communicating with said combustion air passage, and means in-

cluding an elastic connector for securing said air silencer to said engine block, said elastic connector including a first part



connected to said air silencer and a second part connected to said engine block independently of said air silencer.

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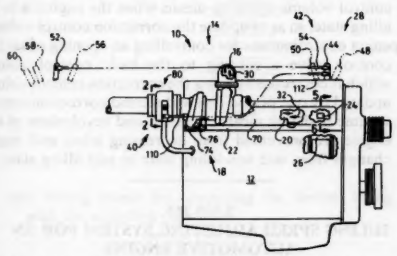
**5,035,212**

## ENGINE FLOW RESTRICTION CONTROL

**Gregory L. Hudson, Brimfield, Ill.; Khaled M. Issa, Raleigh, N.C.; Randall R. Richards, Chillicothe, and William L. Sprick, Peoria, both of Ill., assignors to Caterpillar Inc., Peoria, Ill.**

**Filed Apr. 2, 1990, Ser. No. 502,901**
**Int. Cl.[5] F02D** *9/06, 31/00*
**U.S. Cl. 123—323** **17 Claims**



1. An engine including a cylinder head having at least one intake passage and one exhaust passage therein, at least a single combustion chamber in fluid communication with the passages, a fuel system having a portion thereof in fluid communication with the combustion chamber, said fuel system including a throttle being movable between a low idle position and a high idle position and an exhaust system including an exhaust manifold having a passage therein, said passage being in fluid communication with one of the passages in the cylinder head, a flow of intake air entering the combustion chamber, a flow of exhaust originating in the combustion chamber and passing through the passages in the cylinder head and the exhaust manifold, comprising:

means for restricting one of said intake air flow and the exhaust flow, said means having an opened position and a restricted position; and

a control system interconnecting said throttle and said means for restricting, said control system including a mechanical linkage between the throttle and the means for restricting, said linkage having a preestablished length and movingly positioning the restricted position of the means for restricting one of the intake air flow and the exhaust flow in a position generally corresponding with the low idle position of the throttle.

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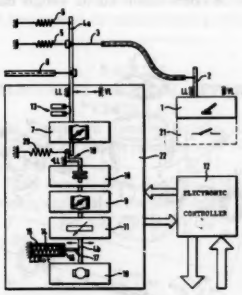
**5,035,213**

## LOAD-SHIFTING DEVICE

**Manfred Pfalzgraf, Frankfurt am Main; Gerd Hickmann, Schwalbach/Ts., and Eberhard Mausner, Liederbach/Ts., all of Fed. Rep. of Germany, assignors to VDO Adolf Schindling AG, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Dec. 22, 1989, Ser. No. 455,608**
**Claims priority, application Fed. Rep. of Germany, Jan. 20, 1989, 3901583**
**Int. Cl.[5] F02D** *45/00, 41/02, 41/16*
**U.S. Cl. 123—336** **7 Claims**




1. A load-shifting device for an internal combustion engine comprising;

a setting member, an electric setting drive, and an electronic controller;

a control element for driving the setting member to establish an output of the internal combustion engine, there being a accelerator for applying fuel to the engine; and

wherein the control element is connected to the accelerator and is controllable by the electric setting drive in cooperation with the electronic controller;

said setting member includes a main setting member and an auxiliary setting member;

said control element includes a first control element part and a second control element part;

said first control-element, part is coupled to said accelerator and to said main setting member;

said second control-element part is coupled to said auxiliary setting member;

said device further comprises an idling stop, and a setting path of said first control-element part is limited in idling direction by said idling stop; and

upon application of said first control-element part against said idling stop, said second control-element part is moved within an idling control range thereof relative to said first control-element part by means of said electric setting drive.

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**5,035,214**

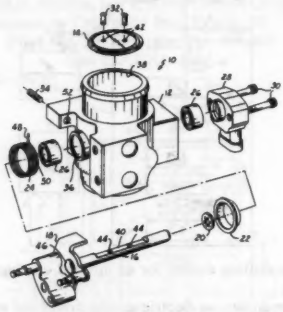
## ENGINE THROTTLE BLADE SEALING

**Paul D. Daly, Troy, and Robert A. McArthur, Drayton Plains, both of Mich., assignors to Siemens Automotive L.P., Auburn, Mich.**

**Filed Feb. 16, 1990, Ser. No. 481,076**
**Int. Cl.[5] F16K** *1/226;* **F02M** *7/00*
**U.S. Cl. 123—337** **9 Claims**

1. In an internal combustion engine having a throttle body assembly for selectively throttling the flow of combustion air into the engine and comprising a throttle body having a circular throughbore of given transverse cross sectional area, a blade disposed in said throughbore and supported on said body for rotary positioning about an axis that is transverse to said

throughbore, and a stop that establishes engine idle by stopping said blade at a particular position in the direction of increasing throttling of said throughbore by said blade, the improvement comprising said blade comprising a main blade body of relatively rigid material and of area in plan that is less than said given transverse cross sectional area, and a peripheral sealing means that is disposed on, and extends circumferentially around at least a majority of the radially outer margin of said main blade body, said sealing means having a resilient radially outer portion whose radially outermost portion lies on a circle whose diameter is essentially equal to that of said circular throughbore, and said sealing means cooperating with said throughbore such that said blade is operable to be positioned about said axis in the direction of increasing throttling to cause increasing throttling of the flow of combustion air into the engine until said stop prevents said blade from further throttling the flow of combustion air at which time said sealing



means permits sufficient flow of combustion air to run the engine at desired idle speed without stalling, in which said sealing means extends circumferentially around the entire radially outer margin of said main blade body, the radially outer margin of said main blade body is circular, said sealing means has a circular annular shape fitting to the circular radially outer margin of said main blade body, said sealing means comprises an elastomeric material that is joined to the radially outer margin of said main blade body, said radially outer portion of said sealing means being a radially outer portion of said elastomeric material, said elastomeric material having a radially inner portion that is disposed radially inwardly of, and that is of increased thickness from that of, said radially outer portion of said elastomeric material, and said main blade body comprises one or more apertures in its radially outer margin, and a portion of said elastomeric material is disposed in said one or more apertures.

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**5,035,215**

## ENGINE REVOLUTION CONTROL APPARATUS FOR VEHICLE

**Hirofumi Ohuchi, Himeji, Japan, assignor to Mitsubishi Denki K.K., Tokyo, Japan**

**Filed Jul. 12, 1990, Ser. No. 551,347**

**Claims priority, application Japan, Jul. 13, 1989, 1-180959; Jul. 13, 1989, 1-180961**

**Int. Cl.[5] F02D *41/16***

**U.S. Cl. 123—339** **8 Claims**

1. An engine revolution control apparatus for a vehicle which controls revolutions of an engine when the engine is in an idling state by using an air control valve located in a by-pass conduit for by-passing a throttle valve, said apparatus comprising:

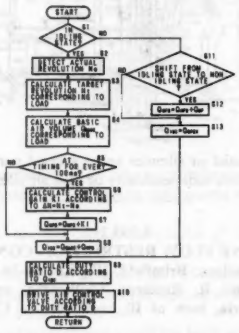
revolution detecting means for detecting revolutions of said engine;

first decision means for deciding whether said engine is in one of the idling state and a non-idling state;

first correction control volume updating means for sequentially calculating and updating at a predetermined timing, when said first decision means decides that said engine is in the idling state, a correction control volume to correct a basic control volume related to a volume of airflow through said by-pass conduit so that no deviation occurs between said revolutions detected by said revolution detecting means and target revolutions thereof;

second decision means for deciding, when said first decision means decides that said engine is in the non-idling state, whether a state of said engine has just shifted from the idling state to the non-idling state;

second correction control volume updating means for adding, when said first decision means decides that the engine




is in the non-idling state and said second decision means decides that the engine has just shifted from the idling state to the non-idling state, a predetermined value to the correction control volume updated by said first correction control volume updating means when the engine is in the idling state, so as to update the correction control volume;

opening control means for controlling an opening of said air control valve according to the basic control volume which is corrected by using the correction control volume updated by one of said first and second correction control volume updating means, wherein said revolutions of said engine are prevented from decreasing when said engine changes from said non-idling state to said idling state.

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**5,035,216**

## IDLING SPEED ADJUSTING SYSTEM FOR AN AUTOMOTIVE ENGINE

**Masanori Sakamoto, Hamura, and Masaharu Kubota, Musashino, both of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 9, 1990, Ser. No. 462,586**

**Claims priority, application Japan, Jan. 20, 1989, 1-12847**

**Int. Cl.[5] F02D *41/16***

**U.S. Cl. 123—339** **3 Claims**

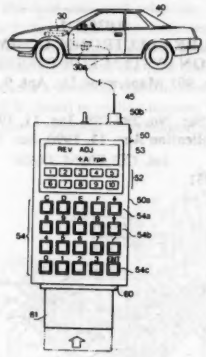
1. an idling speed adjusting system for an automotive engine having an actuator provided to control an idling speed and a control unit including detecting means for producing an actual engine speed signal dependent on an engine speed, sensing means for producing engine operating condition signals dependent on engine operating conditions, setting means responsive to the engine operating condition signals for determining a desired idling speed, and control means for calculating a control value for the actuator in accordance with a difference between the actual engine speed and the desired idling speed, so as to maintain the idling speed of the desired idling speed, the improvement of the system comprising:

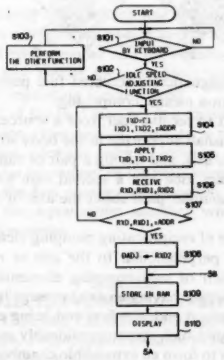
memory means provided in the control unit for storing adjusting data to correct the desired idling speed;

rewriting means provided in the control unit for rewriting the adjusting data;

an outside instrument provided to commant the rewriting means to rewrite the adjusting data;

connecting means provided to connect the outside instrument to the control unit; and





said setting means for correcting the desired idling speed with the adjusting data.

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**5,035,217**

**IDLING ADJUSTING METHOD**

**Hajime Kako, Himeji, Japan, assignor to Mitsubishi Denki K.K., Tokyo, Japan**

**Filed May 8, 1990, Ser. No. 520,425**

**Claims priority, application Japan, May 10, 1989, 1-117112**

**Int. Cl.[5] F02M *3/00***

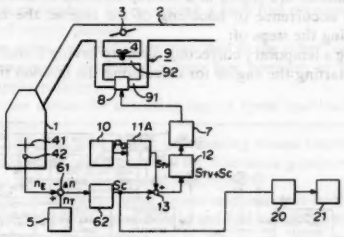
**U.S. Cl. 123—339** **4 Claims**

1. An idling adjusting method for the engine of a vehicle wherein an intake air quantity for the engine is adjusted independent of a flow rate control means so that a revolution number correcting signal, or a signal related thereto, is within a predetermined value, said method comprising the steps of:

providing a reference signal generating means for outputting a reference control signal necessary for maintaining a target engine revolution number;

providing a correction signal generating means for generating a revolution number correction signal corresponding to a direction needed to reduce a deviation between an actual engine revolution number and a target engine revolution number; and

providing the flow rate control means for controlling the intake air quantity for the engine so as to increase or decrease said actual engine revolution number responsive to the reference control signal and the revolution number



correction signal, wherein said reference control signal is changed responsive to atmospheric pressure.

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**5,035,218**

**THROTTLE VALVE CONTROL APPARATUS FOR VEHICLES**

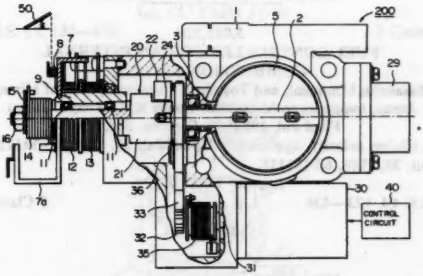
**Kanji Takeuchi, Gamagori; Yousuke Setaka, Anjo, and Satoshi Arita, Chiryu, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Jun. 7, 1990, Ser. No. 534,647**

**Claims priority, application Japan, Jun. 8, 1989, 1-146500**

**Int. Cl.[5] F02D *11/10***

**U.S. Cl. 123—361** **3 Claims**



1. A throttle valve control apparatus for vehicles comprising:

a throttle valve element supported on a valve shaft;

means for transferring an operating force of an accelerator operation part to said throttle valve element;

a motor for driving said throttle valve element;

stopper means for transferring a driving force of said motor to said valve shaft, said stopper means having a gear part driven by said motor, and a restraint part for restraining an opening degree of said throttle valve element; and

a notch provided near said restraint part, thereby preventing said stopper from contacting said valve shaft.

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**5,035,219**

**METHOD FOR CONTROLLING IGNITION TIMING OF AN INTERNAL COMBUSTION ENGINE**

**Hiroya Ohkumo, Musashino, and Shuji Miyama, Musashimurayama, both of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed May 4, 1990, Ser. No. 518,799**

**Claims priority, application Japan, May 18, 1989, 1-125135**

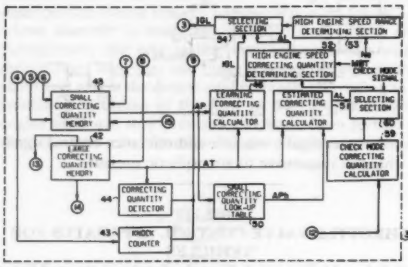
**Int. Cl.[5] F02P *5/15***

**U.S. Cl. 123—425** **6 Claims**

1. A method for controlling ignition timing of an internal combustion engine having an ignition timing control system for calculating an ignition timing based on a basic ignition

timing and a learning correcting quantity including a large correcting quantity and a small correcting quantity, wherein said quantities are stored in a backup memory in accordance with an occurrence of knocking of the engine, the method comprising the steps of:

storing a temporary correcting quantity having a small value at starting the engine for calculating the ignition timing;




increasing the temporary correcting quantity in an advance direction until knocking of the engine occurs;

comparing the temporary correcting quantity with the large correcting quantity and determining a proper correcting quantity as a correcting quantity; and

calculating the ignition timing based on a difference between said large and temporary correcting quantities.

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**5,035,220**

**FUEL CONTROLLER FOR AN INTERNAL COMBUSTION ENGINE**

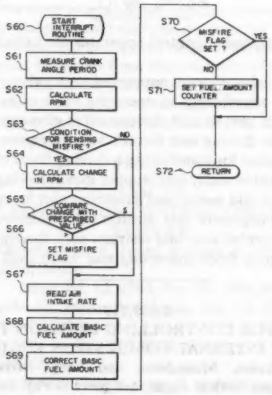
**Masanobu Uchinami, and Toshihisa Takahashi, both of Himeji, Japan, assignors to Mitsubishi Denki K.K., Tokyo, Japan**

**Filed Jul. 19, 1989, Ser. No. 381,919**

**Claims priority, application Japan, Jul. 20, 1988, 63-181117; Jul. 20, 1988, 63-181118**

**Int. Cl.[5] F02D *41/26***

**U.S. Cl. 123—436** **7 Claims**




1. A fuel controller for an internal combustion engine having a plurality of cylinders and a plurality of fuel injectors which supply fuel to the cylinders, comprising:

misfiring sensing means for sensing a misfiring cylinder of the engine, said misfiring sensing means comprising means for measuring the engine rotational speed during the power stroke of each cylinder, and means for determining when the rotational speed between successive power strokes for successive cylinders has fallen by more than a prescribed quantity; and

fuel supply cut-off means for cutting off the supply of fuel to only the misfiring cylinder.

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**5,035,221**

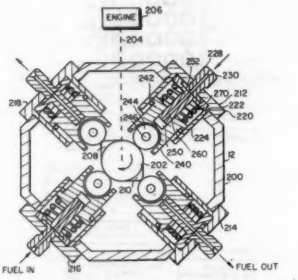
**HIGH PRESSURE ELECTRONIC COMMON-RAIL FUEL INJECTION SYSTEM FOR DIESEL ENGINES**

**Tiby M. Martin, 901 Maplewood Dr. Apt. 9, Cedar Falls, Iowa 50613**

**Division of Ser. No. 295,588, Jan. 11, 1989, abandoned. This application Apr. 11, 1990, Ser. No. 508,068**

**Int. Cl.[5] F02M *37/04***

**U.S. Cl. 123—451** **6 Claims**




1. An electromagnetically-actuated fuel pump for a diesel engine fuel injection means, comprising:

a body adapted to receive fuel from a source;

a rotatable camshaft supported in the body so as to be rotatable about an axis, and having a pair of cam lobes including a first cam lobe and a second cam lobe adapted to rotate in an annular path about the axis of rotation of the camshaft;

at least one pair of reciprocating pumping elements mounted in the body perpendicular to the axis of rotation of the camshaft, each of said pumping elements including an elongated plunger having an axial passage including a first end and a second end, the first end being connected to a source of liquid fuel, structure slideably mounted on the plunger so as to form an expandible chamber at the second end of the axial passage, and being moveable either to enlarge or reduce the volume of the chamber depending upon the direction of relative motion of said structure and the plunger, tappet means connecting the camshaft to said structure such that as the chamber is being enlarged in volume, fuel is received therein, and as the chamber is being reduced in volume, fuel is discharged therefrom; and

means for fluidly connecting the pumping elements to fuel injection means for passing fuel under pressure thereto in response to rotation of the camshaft.

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**5,035,222**

**SYSTEM FOR CORRECTING THE COMPOSITION OF FUEL-AIR MIXTURE UPON A CHANGE IN THE STATE OF LOADING OF AN INTERNAL COMBUSTION ENGINE**

**Martin Feldinger, Königstein, Fed. Rep. of Germany, assignor to VDO Adolf Schindling AG, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Dec. 1, 1989, Ser. No. 444,770**

**Claims priority, application Fed. Rep. of Germany, Jan. 26, 1989, 3902284**

**Int. Cl.[5] F02M *37/04***

**U.S. Cl. 123—452** **10 Claims**

1. A system for a mixing device for correction the composition of a fuel-air mixture upon a change in state of load of an

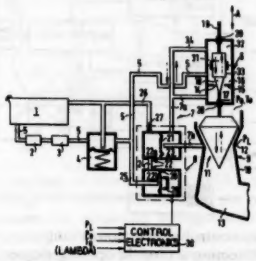
internal combustion engine having a fuel-air mixture device, comprising

a fuel feed unit;

an inlet-side fuel feed line and an outlet-side fuel-feed line connected to the feed unit; and wherein

the feed unit includes a movably mounted feed member which, as a function of its position, establishes variable fuel passage cross-sections in the feed unit;

the feed unit includes a movable equalization element and an opening which is closed in sealing manner by the equalization element, there being an equalization space connected




to the opening and a branch line connecting the equalization space with the outlet-side fuel delivery line;

wherein the feed member and the equalization element are mechanically locked for movement with each other to provide a regulating function; and

a movement of the feed member in a direction enlarging the fuel passage cross-section leads to a movement of the equalization element which reduces the equalization space, and a movement of the feed member in a direction reducing the fuel passage cross-section leads to a movement of the equalization member which enlarges the equalization space.

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**5,035,223**

## FUEL INJECTION CONTROL SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

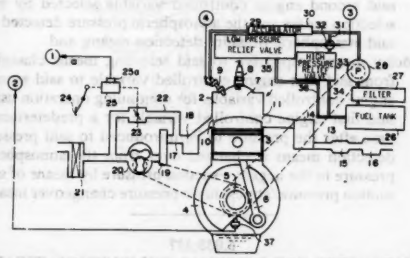
**Hideo Watanabe, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 13, 1990, Ser. No. 553,780**

**Claims priority, application Japan, Aug. 15, 1989, 1-210425**

**Int. Cl.[5] F02M *37/04***

**U.S. Cl. 123—459** **4 Claims**




1. A system for controlling fuel injection for an internal combustion engine having at least one cylinder, a fuel injector provided for injecting fuel directly in the cylinder and a fuel pump for supplying the fuel from a fuel tank to the fuel injector passing through a fuel supply passage, the system comprising:

at least two fuel return passages communicating said fuel supply passage with said fuel tank;

a changeover valve provided in said passage for selectively connecting said fuel supply passage with one of said fuel return passages;

a high pressure relief valve provided in one of said fuel return passages for providing a high fuel pressure in said fuel supply passage;

a low pressure relief valve provided in the other fuel return passage for providing a low fuel pressure in said fuel supply passage;

detector means for detecting engine speed and load on the engine;

fuel injection pulse width determining means responsive to said engine speed and load for determining pulse width of the fuel injection by said fuel injector;

fuel pressure determining means responsive to said load for determining pressure of injected fuel and for producing a fuel pressure signal;

first driving means responsive to said fuel pressure signal for operating said changeover valve for selecting one of said pressure relief valves for providing the determined fuel pressure; and

second driving means for operating the fuel injector to inject the fuel at said determined pulse width.

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**5,035,224**

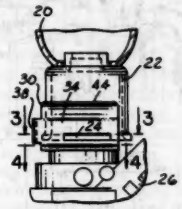
## CLIP RETENTION OF A SPLIT-STREAM FUEL INJECTOR TO A FUEL RAIL CUP INCLUDING CIRCUMFERENTIAL LOCATOR

**Michael J. Hornby, Williamsburg; Dean Spiers, Hampton, and Stephen Cranford, Newport News, all of Va., assignors to Siemens Automotive L.P., Auburn Hills, Mich.**

**Filed Jul. 6, 1990, Ser. No. 549,326**

**Int. Cl.[5] F02M *37/04***

**U.S. Cl. 123—470** **2 Claims**



1. In an internal combustion engine fuel injection system having a fuel rail through which pressurized liquid fuel is supplied to an electrically controlled fuel injector assembled to said fuel rail, the assembly of said fuel injector to said fuel rail comprising a cup which is on said fuel rail and within which a fuel inlet at one axial end of said injector is sealedly disposed, and a one-piece retention clip mechanically engaging both said cup and said fuel injector for mechanical retention of the latter on the former, said fuel injector comprising slot structure formed in an exterior surface thereof and lying in a plane that is transverse to the axis of said fuel injector, said cup comprising a radially outwardly directed lip, said retention clip comprising first and second axially extending side wall portions disposed diametrically opposite each other and axially overlapping the assembled cup and fuel injector, and a third axially extending side wall portion joining said first and second axially extending side wall portions such that, when said clip is viewed axially, said first, second, and third side wall portions present a general channel shape having an entrance that is diametrically opposite said third side wall portion, said first and second side wall portions comprising radially inwardly directed flanges coacting with said exterior surface of said fuel injector including said slot structure thereof to locate said injector both axially and circumferentially relative to said clip, said clip further comprising its own slot structure arranged generally transverse to the injector axis, said slot structure of said clip coacting with said lip such that said clip is located axially relative to

said cup to thereby locate the injector axially relative to said cup, said clip being resiliently expansible for enlargement of said entrance to allow said injector to pass through said entrance preparatory to assembly of said injector to said cup and become axially and circumferentially located relative to said clip by the coaction of said flanges with said injector's slot structure and also to allow said clip to be displaced axially onto said cup at assembly of said injector to said cup to coact said clip's slot structure with said cup's lip for axially locating said cup and said clip to each other;

the improvement which comprises means for also circumferentially locating said clip to said cup at assembly of said injector to said cup, and hence circumferentially locating said injector to said cup, said means of the improvement comprising a radial key on said lip, said key coacting with said first and second side wall portions of said clip to circumferentially locate said cup to said injector.

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**5,035,225**

## FUEL INJECTION CONTROL APPARATUS OF INTERNAL COMBUSTION ENGINE

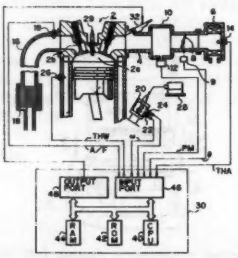
**Masashi Mizukoshi, Susono, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan**

**Filed Sep. 4, 1990, Ser. No. 578,773**

**Claims priority, application Japan, Sep. 4, 1989, 1-228644; Dec. 18, 1989, 1-329070**

**Int. Cl.[5] F02M *51/00***

**U.S. Cl. 123—493** **25 Claims**



1. A fuel injection control apparatus of an internal combustion engine having an intake passage, comprising:

a fuel injector for injecting fuel in the intake passage;

fuel injection amount calculation means for calculating the regular fuel injection amount to be injected from the fuel injector based on a control law determined in accordance with a fuel dynamic model expressing the dynamics of the fuel flowing into a cylinder of the engine;

fuel injection stopping means for stopping the regular fuel injection based on the calculation by said regular fuel injection amount calculation means;

control law correction fuel injection means for performing control law correction injection during the stoppage of the regular fuel injection;

fuel sticking rate calculation means for calculating the rate of sticking of the control law correction injected fuel to the walls of the intake passage based on the amount of control law correction fuel injected during the stoppage of the regular fuel injection, amount of air flowing into the cylinder, and the air-fuel ratio of the air-fuel mixture flowing into the cylinder; and

correction means for correcting the control law with respect to the amount of injected fuel to be supplied to the engine and making the air-fuel ratio a predetermined air-fuel ratio based on the calculated rate of sticking of fuel.

**5,035,226**

## ENGINE CONTROL SYSTEM

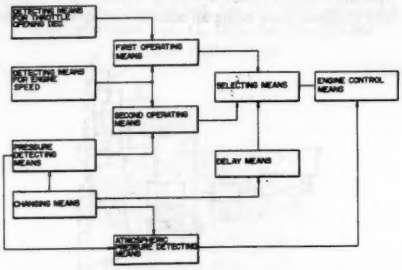
**Seiichirou Nishikawa, Anjo, and Kenichiro Kamai, Kariya, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Jan. 9, 1990, Ser. No. 462,402**

**Claims priority, application Japan, Jan. 16, 1989, 1-8083**

**Int. Cl.[5] F02D *41/02***

**U.S. Cl. 123—494** **13 Claims**




1. An engine control system comprising:

means for detecting a throttle opening degree of an engine;

means for detecting a speed of said engine;

means for detecting a pressure which is applied to said pressure detection means;

first operating means for operating a first engine controlled variable on the basis of a throttle opening degree signal from said throttle opening degree detection means and a speed signal from said speed detection means;

second operating means for operating a second engine controlled variable on the basis of a negative suction pressure signal from said pressure detection means and the speed signal from said speed detection means;

means for selecting one of said first engine controlled variable or said second engine controlled variable according to engine conditions;

suction pressure/atmospheric pressure changeover means for introducing to said pressure detection means a) an atmospheric pressure when said selection means selects said first engine controlled variable and b) the negative suction pressure when said selection means selects said second engine controlled variable;

means for detecting atmospheric pressure based on an output from said pressure detection means to which the atmospheric pressure is introduced by means of said changeover means;

means for controlling said engine on the basis of said first or said second engine controlled variable selected by said selection means and the atmospheric pressure detected by said atmospheric pressure detection means; and

delay means responsive to said selecting means changing from said first engine controlled variable to said second engine controlled variable, for continuing operation using said first engine controlled variable for a predetermined time after the pressure to be introduced to said pressure detection means is changed over from the atmospheric pressure to the negative suction pressure by means of said suction pressure/atmospheric pressure changeover means.

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**5,035,227**

## VAPORIZER FOR INTERNAL COMBUSTION STEAM ENGINE

**Herbert N. W. Hansen, 432 Wing Park Blvd., Elgin, Ill. 60120**

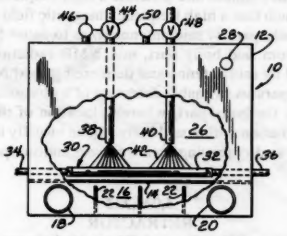
**Filed Feb. 2, 1990, Ser. No. 474,559**

**Int. Cl.[5] F02M *33/00***

**U.S. Cl. 123—557** **7 Claims**

1. Alcohol/water fuel vaporizing apparatus for internal combustion steam engines, the engine requiring and operating substantially on vaporized non-hydrocarbon based fuel for

combustion and producing heated exhaust gases as a byproduct of such combustion; the fuel vaporizer comprising a first exhaust gas chamber and a second fuel vapor chamber, said respective chambers sharing a common wall therebetween; the exhaust gas chamber having spaced apart exhaust gas inlet and outlet means for channeling engine exhaust gases through said first chamber whereby the passage of the exhaust gases there-




through causes heating of the common wall; vapor outlet means for the passage of vaporized fuel from the vapor chamber; fuel inlet means for admitting unvaporized fuel to the vapor chamber; means for directing the unvaporized fuel from the fuel inlet means against the heated common wall whereby contact of the fuel against the common wall causes the immediate vaporization of the fuel substantially without regard to the impurity or proofage content of the fuel.

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**5,035,228**

## EXHAUST-GAS RECYCLING DEVICE FOR AN INTERNAL-COMBUSTION ENGINE, EPSECIALLY A DIESEL ENGINE

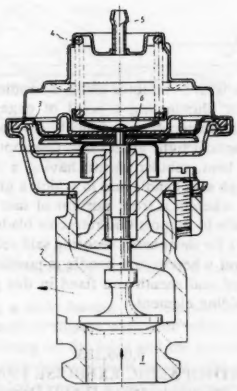
**Franz Bender, Wendlingen, Fed. Rep. of Germany, assignor to Mercedes-Benz AG, Fed. Rep. of Germany**

**Filed Sep. 18, 1990, Ser. No. 584,924**

**Claims priority, application Fed. Rep. of Germany, Sep. 23, 1989, 3931812**

**Int. Cl.[5] F02M *25/07*; F02D *21/08***

**U.S. Cl. 123—568** **15 Claims**




1. Exhaust-gas recycling device for an internal-combustion engine, especially a diesel engine, in which an exhaust-gas part stream can be returned to the combustion spaces of the engine by means of a line which can be shut off by a spring-loaded exhaust-gas recycling valve, the spring of the exhaust-gas recycling valve pressing against a diaphragm exposed to a vacuum dependent on engine-operating data, with the force directed counter to the vacuum, the valve being closed in the case of an excess of the spring force and the valve being opened ranging from partially to completely in the case of an excess of the force of the vacuum, depending on the amount of this excess, wherein the force of the spring acting on the diaphragm is temperature-dependent.

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**5,035,229**

## IGNITION DEVICE FOR AN INTERNAL COMBUSTION ENGINE

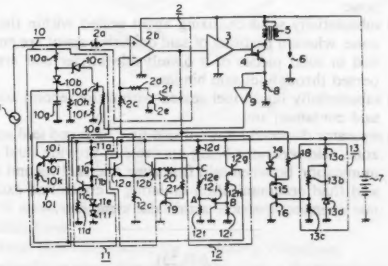
**Mitsuru Koiwa, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Jun. 5, 1990, Ser. No. 533,320**

**Claims priority, application Japan, Jun. 7, 1989, 1-142927; Jun. 7, 1989, 1-142929**

**Int. Cl.[5] F02P *7/077***

**U.S. Cl. 123—626** **1 Claim**




1. An ignition device for an internal combustion engine which comprises:

an ignition signal generating device which generates in synchronism with the revolution of an engine an ignition signal having the magnitude corresponding to a revolution number of the engine,

a bias circuit which generates a bias voltage corresponding to the revolution number of the engine so as to superimpose the bias voltage on the ignition signal so that the closing rate of the primary power feeding circuit for an ignition coil is controlled,

a switching operation level setting circuit for generating a set voltage which changes depending on the revolution number of the engine at the time of the starting of the engine or at the idling operation,

a comparison circuit having a first input terminal adapted to receive a superimposed output of the ignition signal and the bias voltage and a second input terminal adapted to receive the set voltage wherein the comparison circuit generates an output inversed in level in response to the magnitude of input signals at the first and second input terminals,

a transistor to feed or break a current to be fed to the ignition coil by an output from the comparison circuit,

a histeresis setting circuit to impart histeresis to the switching operation of the comparison circuit by changing the set voltage inputted to the second input terminal in synchronism with the turning-on of the transistor,

a reference voltage generating circuit which fixes the potential of a plurality of resistors in the bias circuit when a power source voltage exceeds a predetermined value, and

a transistor circuit which controls current conduction to the plurality of resistors and the reference voltage generating circuit in response to the operation of the comparison circuit, wherein the magnitude of said set voltage is changed in response to a value of revolution number of the engine between the staring time and the idling time of the engine in such a manner that when the engine is started, the potential difference between voltages at the input terminals of the comparison circuit, the voltages being determined by the bias voltage and the set voltage,

assumes a first value which is smaller than the voltage of ignition signal, and when the engine is idling, the potential difference assumes a second value which is smaller than the voltage of ignition signal, but is sufficiently larger than the first value.

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5,035,230

## DISPOSABLE FOOD HEATER

**Gary V. Steidl, 304 Via De Caballo, Olivenhain, Calif. 92024; Cullen M. Sabin, 3346 Ullman St., San Diego, Calif. 92109, and Dennis A. Thomas, 20032 Pacific Coast Hwy., Malibu, Calif. 90265**

**Filed Feb. 23, 1990, Ser. No. 484,227**

**Int. Cl.[5] F24J *1/00***

**U.S. Cl. 126—263** **27 Claims**

1. A heater, comprising:

a disposable container divided into a first zone and a second zone;

a substantially solid oxidizing agent sealed within the first zone, wherein particles of said oxidizing agent are embedded in solid pieces of a dissolvable binder and are dispersed throughout said binder;

a substantially liquid fuel sealed within the second zone of said container; and

a separator disposed between said first zone and said second zone, said separator being operable to provide fluid communication between said first zone and said second zone, said fluid communication initiating a controlled exothermic chemical reaction within said container.

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5,035,231

## ENDOSCOPE APPARATUS

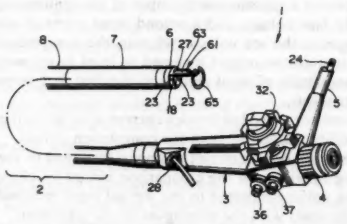
**Hiroaki Kubokawa; Takashi Tsukaya, both of Hachioji; Yasuhiro Ueda, Kokubunji; Yutaka Ohshima, Hachioji; Takeaki Nakamura, Hino; Hiroki Hibino; Shuichi Takayama, both of Hachioji, and Tadao Hagino, Yokohama, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Apr. 25, 1988, Ser. No. 186,332**

**Claims priority, application Japan, Apr. 27, 1987, 62-104033; Apr. 28, 1987, 62-105868; Apr. 28, 1987, 62-105870; Jul. 15, 1987, 62-176532; Jul. 15, 1987, 62-176534; Aug. 10, 1987, 62-199395; Aug. 10, 1987, 62-199396; Aug. 11, 1987, 62-200292; Aug. 18, 1987, 62-205539; Aug. 18, 1987, 62-205540; Aug. 18, 1987, 62-205541**

**Int. Cl.[5] A61B *1/00, 5/05***

**U.S. Cl. 128—6** **26 Claims**




1. An NMR metering endoscope apparatus comprising:

an endoscope having an elongate insertable part having a tip part insertable into a body and including an observing window and an illuminating window formed in the tip part, an observing means having a visual field for observing an object to be imaged by receiving light from the object entering through said observing window, an illuminating light output means for emitting an illuminating light through said illuminating window and a hollow channel formed within said insertable part including an opening in said tip part; and

an NMR (nuclear magnetic resonance) metering probe having a signal transmitting member insertable into said body through said channel and opening, said probe being connected at one end to an NMR metering apparatus so as to transmit high frequency signals therefrom, and a loop-like antenna connected to the other end of said signal transmitting member to receive said high frequency signals, said loop-like antenna being projected out of the opening of said channel formed in said tip part to radiate said high frequency signals and generate a high frequency magnetic field such that a high frequency magnetic field is delivered to a body part by said antenna so as to cause NMR radiation from said body part, said NMR radiation being received by said antenna and delivered to said NMR metering apparatus to enable detection of a physiological variation in the body part, whereby location of the source of the radiation within said body can be visually identified by use of said observing means of said endoscope.

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5,035,232

## RETRACTOR

**Theodor Lutze, Balgheim, and Dieter Weisshaupt, Immendingen, both of Fed. Rep. of Germany, assignors to Aesculap AG, Fed. Rep. of Germany**

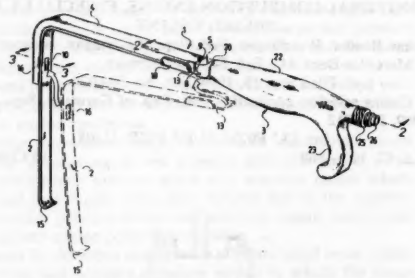
**PCT No. PCT/EP88/00945, § 371 Date Mar. 30, 1990, § 102(e) Date Mar. 30, 1990, PCT Pub. No. WO89/03660, PCT Pub. Date May 5, 1989**

**PCT Filed Oct. 21, 1988, Ser. No. 469,577**

**Claims priority, application Fed. Rep. of Germany, Oct. 24, 1987, 3736066**

**Int. Cl.[5] A61B *17/02***

**U.S. Cl. 128—20** **14 Claims**



1. Retractor with a retractor blade, a handle, a fiber-optical light guide for illuminating a point of engagement of said retractor and a connector for connecting a fiber-optical cable to said fiber-optical light guide, said fiber-optical light guide comprising a bent, tubular sheath having a rear end which extends through said handle and in which a glass fiber bundle is embedded, wherein a front portion of said sheath extends from said handle to support said retractor blade and comprises fixing elements for detachably securing said retractor blade on said sheath, and wherein said handle is positioned loosely on the rear end of said sheath and fixed in this positioned by a detachable holding element.

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5,035,233

## ORTHOPAEDIC EXERCISE FRAME

**Hermann Ruf, Pfützenstr. 45048, D-6103 Darmstadt-Griesheim, Fed. Rep. of Germany**

**Filed Feb. 13, 1990, Ser. No. 479,105**

**Claims priority, application Fed. Rep. of Germany, Feb. 15, 1989, 3904445**

**Int. Cl.[5] A63B *23/04***

**U.S. Cl. 128—25 B** **15 Claims**

15. An orthopaedic exercise frame which comprises:

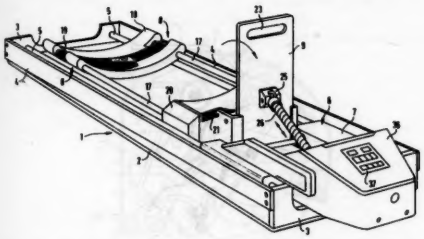
a chassis;

a nondriven carriage freely slidable on said chassis in a

longitudinal direction and dimensioned to receive a leg of a patient to be exercised on the frame;

a calf support on said carriage engageable beneath a calf portion of said leg;

a foot support on said carriage engageable beneath a foot portion of said leg;



means for pivotally mounting said calf support and said foot support on said carriage to enable pivotal motion of said calf and foot supports relative to said carriage for flexure and extension of said leg about a pivot axis transverse to said longitudinal direction; and

a drive on said carriage for effecting said pivotal motion of said calf and foot supports relative to said carriage for flexure and extension of said leg about said pivot axis.

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**5,035,234**

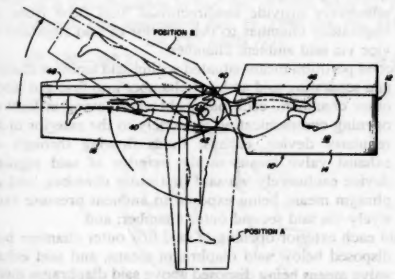
## METHOD FOR FUNCTIONAL EVALUATION AND EXERCISING THE BACK MUSCLES OF A PERSON

**Kenneth D. Forsythe, 307 Montana Ave., (Suite 302), Santa Monica, Calif. 90403**

**Filed Aug. 11, 1988, Ser. No. 231,054**

**Int. Cl.[5] A61H *1/02*; A63B *21/00***

**U.S. Cl. 128—25 R** **2 Claims**




1. A method of exercising the body of a person comprising the steps of:

(a) providing a table having first and second separate but adjacent sections aligned with each other so that the of a person reclining on the table and the second section supports the lower body of such person, said second section being mounted to rotate about a vertical axis, and

(b) positioning the body of the person on the table in a reclining posture on their side so that the greater trochanters of the legs of the person are aligned with said vertical axis, with said axis intersection said trochanters, and

(c) with the person secured to the table, said person moving the second section of the table with the lower body to rotate said section about the vertical axis and bend the lower body relative to the torso, and thereby exercise the back of a person in a safe manner therapeutically.

**5,035,235**

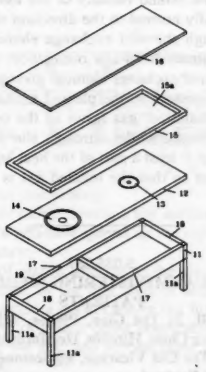
## MUSIC VIBRATION TABLE AND SYSTEM

**Kris S. Chesky, 1011 Avenue A, Denton, Tex. 76201**

**Filed Jun. 25, 1990, Ser. No. 542,907**

**Int. Cl.[5] A61H *1/00***

**U.S. Cl. 128—33** **11 Claims**



1. A music vibration table system, comprising:

a table base;

at least two transducers for producing vibrations;

a transducer mounting panel for mounting the transducer on the table base;

a vibrating membrane;

a spacing frame for mounting the vibrating membrane over the transducers; and

sensors connected to the vibrating membrane by a rigid rod to detect vibration amplitudes and frequencies of the membrane at the sensor locations;

wherein the transducers when stimulated with music or sound produce vibrations in said vibrating membrane.

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**5,035,236**

## FILTRATION DEVICE FOR RESPIRATORY GASSES WITH HEAT AND MOISTURE EXCHANGE

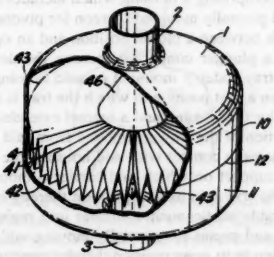
**Rahul G. Kanegaonkar, Hythe, England, assignor to Smiths Industries Public Limited Company, London, England**

**Filed Jun. 19, 1990, Ser. No. 540,266**

**Claims priority, application United Kingdom, Jul. 18, 1989, 8916361**

**Int. Cl.[5] A61M *16/10*; B01D *27/07, 29/07***

**U.S. Cl. 128—201.13** **9 Claims**



1. A medico-surgical heat and moisture exchange device including means for transferring heat and moisture in exhaled respiratory gas to inhaled respiratory gas comprising an outer casing having an inlet port adapted for connection to a ventilation circuit and an outlet port adapted for connection to a

patient's respiratory system, said means further comprising an exchange element within the casing intermediate said inlet and outlet ports so positioned that gas flow through said casing between said inlet and outlet ports passes through said exchange element, said exchange element comprising a strip of material folded into a plurality of pleats laterally of the length of the strip, and said strip being bent into a loop such that the folds of the pleats extend radially of the loop in two parallel planes substantially normal to the direction of flow of respiratory gases through the said exchange element such that, on exhalation, gas flows from the outlet port to the inlet port through the pleated exchange element giving up at least a part of its heat and moisture to the pleated exchange element and such that, on inhalation, gas flows in the opposite direction from the inlet to the outlet through the pleated exchange element taking up at least a part of the heat and moisture in the exchange element so that the inhaled gas is thereby warmed and moistened.

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**5,035,237**

## DEVICES FOR ADMINISTERING MEDICAMENTS TO PATIENTS

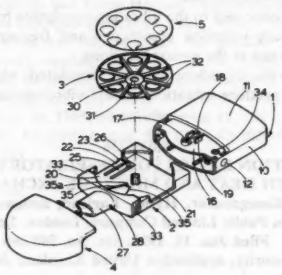
**Robert E. Newell, 21 The Glen, Pinner, Middlesex; Paul K. Rand, 29 Kipling Close, Hitchin, Hertfordshire, and Robert A. Fitzsimmons, The Old Vicarage, Egglestone, Barnard Castle, Durham, all of England**

**Division of Ser. No. 891,536, Jul. 29, 1986, Pat. No. 4,811,731. This application Dec. 27, 1988, Ser. No. 290,628**

**Claims priority, application United Kingdom, Jul. 30, 1985, 8519141; Oct. 10, 1985, 8525067**

**Int. Cl.[5] A61M *15/00***

**U.S. Cl. 128—203.15** **14 Claims**



1. In a device for administering medicaments to patients, the medicaments being in solid finely divided form and enclosed within at least one puncturable container mounted on a carrier, said device comprising a housing which includes a base member and a lid pivotally mounted thereon for pivotal movement about an axis between a closed position and an open position and having a plunger connected thereto; the device further including a tray slidably mounted on said housing for movement between a first position in which the tray is substantially surrounded by the housing and a second extended position in which a portion of the tray is removed from said housing but the tray remains in contact with said housing, the tray further including a support on which said carrier is mounted; means for sliding the tray into its first position thereby bringing said one puncturable medicament container into registration with the plunger and means for pivotally moving said lid from its closed position to its open position thereby puncturing a medicament container while the tray is in its first position, said tray having an air inlet through which, in use, air enters the device and an outlet through which a patient inhales and whereby medicament is released from said one punctured container and entrained in an air flow produced by a patient.

**5,035,238**

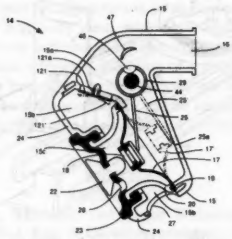
## REGULATOR SECOND STAGE FOR SCUBA

**Tony Christianson, 277 Grulla Ct., Norco, Calif. 91760**

**Division of Ser. No. 103,829, Sep. 30, 1987, Pat. No. 4,862,884. This application Sep. 5, 1989, Ser. No. 403,594**

**Int. Cl.[5] A61M *16/00*; A62B *7/04***

**U.S. Cl. 128—204.26** **3 Claims**



1. A regulator device of an underwater breathing apparatus of the type including a housing having an inlet adapted to be connected to a source of compressed gas and a mouthpiece outlet adapted to be connected to a mouthpiece means, and demand valve means for controlling the flow of breathing gas from said inlet to said outlet, the improvement comprising:

said housing having a first partition means mounted in and separating the interior of said housing into a respiratory chamber communicating with said mouthpiece outlet, and an ambient chamber communicating to the exterior of said regulator device;

said first partition means having first and second closely spaced openings therein;

diaphragm means adapted to overlay said first of said closely spaced openings in said first partition means, said diaphragm means flexibly responsive to pressure differences between said respiratory chamber and said ambient chamber;

exhaust valve means overlaying said second of said closely spaced openings, said exhaust valve means arranged to selectively provide unidirectional fluid flow from said respiratory chamber to the exterior of said regulator device via said ambient chamber;

second partition means situated within said ambient chamber and separating said ambient chamber into first and second outer chambers, each outer chamber having at least one opening communicating separately to the exterior of said regulator device, exhaust fluids flowing through said exhaust valve means to the exterior of said regulator device exclusively via said first outer chamber, said diaphragm means being exposed to ambient pressure exclusively via said second outer chamber; and

said each exterior opening of said first outer chamber being disposed below said diaphragm means, and said exhaust valve means being disposed above said diaphragm means, when said mouthpiece outlet is disposed above said diaphragm means.

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**5,035,239**

## POWERED RESPIRATORS

**David B. Edwards, Harrow, England, assignor to Racal Safety Limited, England**

**Filed Jun. 22, 1989, Ser. No. 370,217**

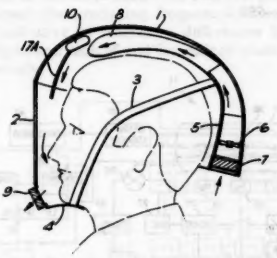
**Claims priority, application United Kingdom, Jun. 25, 1988, 8815179**

**Int. Cl.[5] A62B *7/00***

**U.S. Cl. 128—205.23** **7 Claims**

1. A powered respirator incorporating a differential pressure sensor comprising a flexible pressure-responsive member arranged to be exposed on its opposite sides to the pressure within the respirator in the region of a user's face and to a

references pressure respectively, and adapted to flex in response to change in the differential between said pressures; an emitter and a receiver of selected electromagnetic radiation located side by side and facing towards one side of said pressure-responsive member whereby said member flexes towards or away from the emitter and receiver in dependence upon the pressure differential across it; in a first spacing of said member from the emitter and receiver said radiation being transmitted from the emitter to the receiver via the surface of said one side




of said member and in a second spacing of said member from the emitter and receiver such transmission of radiation from the emitter to the receiver being prevented; said member changing from one of said first or second spacings to the other of said first or second spacings when the pressure in said region falls below a predetermined value in relation to said reference pressure; and means connected to said receiver to provide an electrical warning signal in response to the change of said member from said one to said other of its spacings.

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**5,035,240**

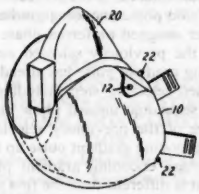
**ELASTOMERIC FILTRATION MATERIALS**

**David L. Braun, Lake Elmo; Peter O. Rekow, Lauderdale, and Daniel E. Meyer, Stillwater, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St Paul, Minn.**

**Continuation of Ser. No. 423,708, Oct. 17, 1989, abandoned, which is a continuation of Ser. No. 193,809, May 13, 1988, abandoned. This application Jun. 19, 1990, Ser. No. 541,081**

**Int. Cl.[5] A62B 7/10**

**U.S. Cl. 128—205.27** **28 Claims**




**24**. A respirator which is substantially spherical in shape and having a filter cartridge therein, said respirator having as a low pressure drop prefilter thereon for removal of particulate fluid contaminants elastomeric nonwoven fibrous fluid filter media comprising thermoplastic elastomeric melt-blown small diameter fibers selected from elastomeric polyurethane fibers, elastomeric polyester fibers, elastomeric polyamide fibers and elastomeric A-B-A′ block copolymers wherein A and A′ are styrenic moieties and B is an elastomeric midblock, the small diameter fibers being randomly arrayed and bonded at points of contact, the filter media having substantially uniform stretch properties in all directions, whose filtration properties are independent of filter media elongations to at least 110 percent of the original filter area.

**5,035,241**

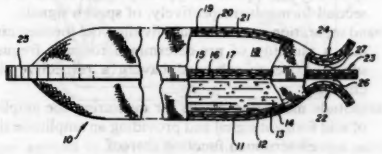
**REUSABLE AND MICROWAVABLE HOT INSULATED COMPRESS AND METHOD OF MANUFACTURE**

**Steven P. Walasek, and Stuart J. Walasek, both of Shavertown, Pa., assignors to Packaging Electronics & Devices Corp., Nanticoke, Pa.**

**Filed Dec. 12, 1989, Ser. No. 448,864**

**Int. Cl.[5] A61F 7/08**

**U.S. Cl. 128—403** **8 Claims**




**1**. A compress comprising:

a first layer of fabric having a top surface;

a first layer of adhesive spread on the top surface of the first layer of fabric;

a first layer of plastic adhered to the top surface of the first layer of fabric by the first layer of adhesive;

a gel contained in a pocket above the first layer of plastic;

a second layer of plastic being positioned above the pocket containing the gel, said second layer of plastic having a top surface;

a second layer of adhesive spread on the top surface of the second layer of plastic;

a layer of insulative material adhered to the top surface of the second layer of plastic by the second layer of adhesive;

sealed off pocket means for providing a dead air space as additional insulation above the layer of insulative material;

a third layer of plastic positioned above the pocket means for providing the dead air space as additional insulation, said third layer of plastic having a top surface;

a third layer of adhesive spread on the top surface of the third layer of plastic; and

a second layer of fabric adhered to the top surface of the third layer of plastic by the third layer of adhesive.

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**5,035,242**

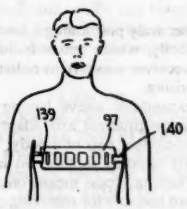
**METHOD AND APPARATUS FOR SOUND RESPONSIVE TACTILE STIMULATION OF DEAF INDIVIDUALS**

**David Franklin; Joseph Franklin, both of 9 Preston Rd., Somerville, Mass. 02143, and Paul Hughes, 17 Howell Rd., Sudbury, Mass. 01776**

**Filed Apr. 16, 1990, Ser. No. 508,728**

**Int. Cl.[5] A61H 1/00**

**U.S. Cl. 128—420.5** **54 Claims**




**1**. A tactile aid apparatus for providing tactile stimulation to a deaf individual in response to acoustic signals and particularly acoustic speech signals, said apparatus comprising:

multiple transducers disposed in an array adapted to be placed against the skin of said individual, each transducer including means responsive to electrical excitation signals applied thereto for providing a tactually sensible vibration to the individual's skin;

acoustic receiver means for receiving said acoustic signals and providing corresponding electrical audio signals;

signal conditioning means responsive to said audio signals for providing a conditioned signal suitable for processing by the apparatus;

first and second formant circuits, each including:

formant separation means responsive to said conditioned signal for passing as respective formant signals only frequency components of said conditioned signal corresponding to frequencies typically found in the first and second formants, respectively, of speech signals;

band separation means for sub-dividing the formant circuit into a plurality of pre-determined formant frequency sub-bands, each sub-band having a respective signal channel;

amplitude measuring means for measuring the amplitude of said formant signal and providing an amplitude signal as a predetermined function thereof;

channel selecting means responsive to said formant signal for measuring the frequency thereof and selecting the formant sub-band in which the measured formant frequency resides;

switching means for applying said amplitude signal to the signal channel corresponding to the formant sub-band selected by the channel selecting means;

wherein each of said transducers is disposed in a respective one of said signal channels; and

excitation means in each of said signal channels for applying to the transducer in that channel an excitation signal as a predetermined function of the amplitude signal in that channel.

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**5,035,243**

## HOLDER SLEEVE FOR POSITIONING A DETECTING AND MEASURING SENSOR

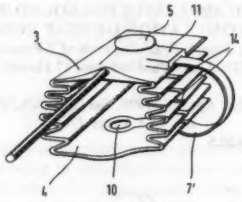
**Edwin Muz, Reutlingen, Fed. Rep. of Germany, assignor to Nicolay GmbH, Fed. Rep. of Germany**

**Filed Mar. 24, 1989, Ser. No. 328,271**

**Claims priority, application Fed. Rep. of Germany, Mar. 26, 1988, 3810411**

**Int. Cl.[5] A61B** *5/024, 5/02*

**U.S. Cl. 128—633** **10 Claims**




1. A holder for securely positioning a sensor on a protruding part of a human body, which sensor includes a light source transmitter and a receiver sensitive to radiation emitted by the transmitter, comprising:

an elastically expandable sleeve having an inside surface surrounding a longitudinal axis adapted to receive and surround a protruding part of a body;

two diametrically opposite sections on said sleeve, each of said sections having recess means on said inside surface opening toward said axis for receiving one of the transmitter and the receiver and to permit radiation to pass through the body between the receiver or transmitter; and

portions of said sleeve between said opposite sections having pluralities of folds adjacent one another around said sleeve in a circumferential direction of said sleeve, each of said folds including inner angle parts defining at least a portion of a contact surface for engaging a body surface, said folds forming a spring;

whereby, a transmitter and a receiver received in said recess means can be pressed against diametrically opposite surface areas of a body protruding part.

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**5,035,244**

## MOTION ARTIFACT MINIMIZATION

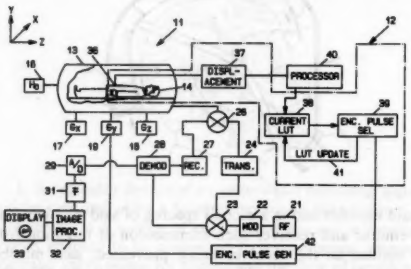
**Saul Stokar, Raanana, Israel, assignor to Elscint Ltd., Haifa, Israel**

**Continuation of Ser. No. 159,124, Feb. 23, 1988, abandoned.**

**This application Feb. 1, 1990, Ser. No. 472,431**

**Int. Cl.[5] A61B** *5/055*

**U.S. Cl. 128—653 A** **7 Claims**




1. A method of reducing respiratory motion artifacts generated while acquiring magnetic resonance imaging (MRI) data of a subject, said method comprising the steps of:

subjecting the subject to a large static magnetic field,

determining a normal maximum amplitude of the subject's respiration cycle measuring from the subject's back to the subject's thorax,

dividing the normal maximum amplitude of the respiration cycle into a number of respiration cycle intervals,

assigning a preferred phase encoding gradient pulse amplitude to each of the intervals,

using a multi-dimensional data acquisition scan sequence with one dimension determined by phase encoding gradient pulses to obtain signals from the subject for use in acquiring magnetic resonance images,

determining the respiration cycle interval at a time for use of one of said phase encoding gradient pulses,

selecting the assigned preferred phase encoding gradient pulse amplitude to be used according to the determined respiration cycle interval of the subject at the time for use of the one of said phase encoding gradient pulses,

selecting another assigned preferred phase encoding gradient pulse, if the previously selected assigned preferred phase encoding gradient pulse has already been used, and said last named selecting step including acquiring data using a next sequential unused phase encoding gradient pulse in place of the previously selected assigned preferred phase encoding gradient pulse up to a next sequential unused phase encoding gradient pulse that has an amplitude that is different than the first selected assigned preferred phase encoding gradient pulse amplitude by X %.

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**5,035,245**

## ULTRASONIC DOPPLER BLOOD FLOW VELOCITY DETECTION APPARATUS

**Yasuhiro Nakamura, Tokyo; Ikuo Sakai, Kawasaki, and Masami Kawabuchi, Yokohama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan**

**Filed May 22, 1989, Ser. No. 355,944**

**Claims priority, application Japan, May 23, 1988, 63-125285**

**Int. Cl.[5] A61B** *8/06*

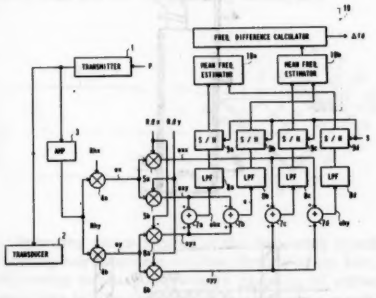
**U.S. Cl. 128—661.09** **9 Claims**

1. An ultrasonic Doppler blood flow velocity detection apparatus comprising:

(a) signal producing means responsive to a clock signal for producing pulses at a predetermined interval, and for producing first and second pairs of quadrature signals having different frequencies f1 and f2 respectively;

(b) transducing means for transmitting ultrasonic waves in response to each of said pulses and for receiving reflected ultrasonic waves from an ultrasonic-wave reflective object in the blood of a human body and converting the received ultrasonic waves into an electric echo signal;

(c) frequency-difference component producing means responsive to said echo signal and said first pair of quadrature signals for producing frequency-difference components indicative of frequency differences between said echo signal and each of said first pair of quadrature signals respectively;




(d) first Doppler signal detecting means for detecting a Doppler signal in a given frequency range within an upper sideband of said frequency f1 from said frequency-difference components in response to said second pair of quadrature signals;

(e) second Doppler signal detecting means for detecting a Doppler signal in another given frequency range within a lower sideband of said frequency f2 from said frequency-difference components in response to said second pair of quadrature signals; and

(f) frequency difference calculating means for calculating frequency difference between output signals from said first and second Doppler signal detecting means;

wherein said frequency f1 is substantially equal to a center frequency of said ultrasonic waves from said transducing means and frequency f2 is determined to provide a desired measurement range of a velocity of said object.

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**5,035,246**

## METHOD FOR CARRYING OUT HEMODYNAMIC MEASUREMENTS ON A PATIENT AND FLOW-DIRECTED BALLOON CATHETER USED FOR THIS

**Joannes H. A. Heuvelmans, Leiduinstraat 4/2, 1058 SJ Amsterdam, and Hieltje Goslinga, Voorstraat 17, 3633 BB Vreeland, both of Netherlands**

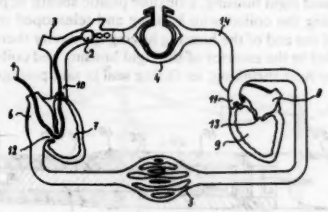
**Filed Jun. 30, 1988, Ser. No. 213,694**

**Claims priority, application Netherlands, Jun. 30, 1987, 8701536**

**Int. Cl.[5] A61B *5/02***

**U.S. Cl. 128—673** **8 Claims**

1. Method for carrying out hemodynamic measurements on a patient, using a flow-directed balloon catheter, which is connected to a control and pressure-measuring unit and is at least provided with a distal measuring lumen and a balloon-inflating lumen, comprising the steps of inserting the catheter by way of a suitable vein until the distal end is positioned inside the thorax, subsequently inflating the balloon, inserting the catheter further by way of the right atrium and ventricle into the pulmonary artery until the distal end with the inflated balloon in wedge position is stuck in a branch thereof and closes off the latter, providing a proximal measuring lumen spaced closely to the distal measuring lumen, measuring the pulmonary arterial pressure (PAP) during insertion of the catheter into the pulmonary artery as long as the catheter has



not yet arrived in the wedge position via both the proximal measuring lumen and the distal measuring lumen, and simultaneously recording the two relevant, virtually identical pressure curves with the measuring unit.

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**5,035,247**

## SENSOR FOR NON-INVASIVE MEASUREMENT OF SOUND, PRESSURE AND VIBRATION ON THE HUMAN BODY

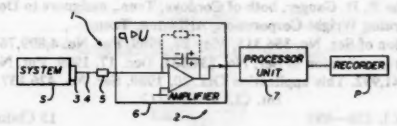
**Jochen Heimann, Leonhardistr. 10a, D-8011 Siegertsbrunn, Fed. Rep. of Germany**

**Filed Dec. 29, 1988, Ser. No. 291,513**

**Claims priority, application Fed. Rep. of Germany, Dec. 31, 1987, 3744605**

**Int. Cl.[5] A61B *5/02***

**U.S. Cl. 128—715** **19 Claims**




1. A sensor for non-invasive measurement of sound, pressure and vibration on the human body comprising:

a sensor cell featuring a probe which can be placed on the surface of said body to sense mechanical input variables;

a housing providing an enclosure;

a transducer comprising a piezoelectric foil diaphragm located in said enclosure with the transducer being coupled to said probe and which converts said mechanical input variables into an electrical signal;

a transmission device connected to said transducer; and

a signal preamplifier connected via said transmission device to said transducer and which can be connected to a processing unit, said housing having a pressure offset port which is smaller than the wavelength to be received.

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**5,035,248**

## POLYOLEFIN SHEATH AND SILICONE O-RING FOR MEDICAL INSTRUMENT

**Hal P. Zinnecker, 8 Belleview Blvd., Belleair, Fla.**

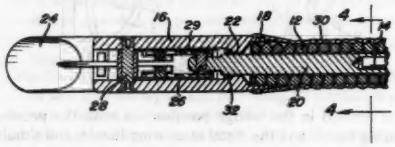
**Filed Apr. 23, 1987, Ser. No. 41,430**

**Int. Cl.[5] A61B *17/32***

**U.S. Cl. 128—751** **1 Claim**

1. In combination, an endoscope having forceps on the end thereof which includes a rigid housing having a forked end pivotally supporting a pair of jaws for use in taking tissue samples for analysis, said rigid housing including a cylindrical tubular passage, a push rod closely received in and slidably mounted in said passage, a pair of pivotal links connecting one end of the push rod to said jaws, an elongated actuating wire connected to the other end of said push rod, a flexible coiled

wire housing enclosing the actuating wire for the jaws, said rigid housing including a cylindrical cavity extending from the end of the rigid housing inwardly toward the passage and telescopically receiving an end of the coiled wire housing, means connecting the end of the coiled wire housing to the cavity in said rigid housing, a flexible plastic sheath of polyolefin enclosing the coiled wire housing and telescoped over the exterior of the end of the housing having the cavity therein and being sealed to the exterior of the rigid housing and coiled wire housing by heat shrinking, an O-ring seal in said passage in the




rigid housing adjacent the forked end in sliding sealed engagement with the periphery of the push rod, said passage including a peripheral groove receiving said O-ring seal, said O-ring seal engaging the exterior of the push rod along a peripheral contact line to prevent entry of contaminants into the space between the push rod and interior of the passage in the rigid housing without substantially increasing the force necessary to be exerted on the actuating wire to actuate the jaws and enabling the endoscope to be reused without cross-contamination of patients after autoclaving.

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**5,035,249**

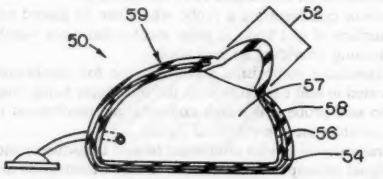
## METHOD OF MAKING ENVELOPE FOR TISSUE EXPANDER

**Gordon H. Sasaki, Pasadena, Calif.; Eugene R. Jakubczak, and John R. D. Gauger, both of Cordova, Tenn., assignors to Dow Corning Wright Corporation, Arlington, Tenn.**

**Division of Ser. No. 356,313, May 24, 1989, Pat. No. 4,899,764, which is a division of Ser. No. 134,331, Dec. 17, 1989, Pat. No. 4,841,992. This application Oct. 20, 1989, Ser. No. 426,137**

**Int. Cl.[5] A61F *2/12***

**U.S. Cl. 128—899** **13 Claims**




2. A method of making an envelope for a tissue expander having a single means for inflation, said method comprising the steps of:

(a) applying a first fluid elastomeric polymer composition, capable of forming a first elastic layer stretchable to at least about 50% of its unstretched length, to less than the entire surface of a mandrel, leaving at least one section of the mandrel surface free of said first composition and capable of forming another cohesive layer thereon;

(b) applying a second fluid elastomeric polymer composition, capable of forming a second elastic layer stretchable to at least about 50% of its unstretched length, to selected other sections of the mandrel surface free of said first composition, so that the mandrel surface is substantially entirely covered with said fluid compositions; and

(c) forming said first and second cohesive layers from said applied compositions into a seamless three-dimensional envelope, said first layer having a greater modulus of elasticity than said second layer, such that one area of said envelope has a greater modulus of elasticity than a surrounding area, allowing the envelope to assume a complex shape.

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**5,035,250**

## CIGARETTE-LIGHTER WITH BUILT-IN EXTINGUISHER DEVICE

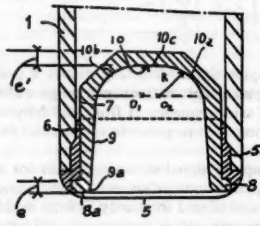
**Yves Mazelie, Les Remparts, Place du Vieux Château, 02460 La Ferte Milon, Aisne, France**

**Continuation-in-part of Ser. No. 168,492, Mar. 15, 1988, abandoned. This application Jul. 12, 1989, Ser. No. 378,939**

**Claims priority, application European Pat. Off., Feb. 26, 1988, 88400449.0**

**Int. Cl.[5] A24F *13/18***

**U.S. Cl. 131—256** **41 Claims**




1. A cigarette lighter forming a cigarette extinguisher comprises a capsule defining a cup-shaped recess having an inner wall of frustoconical revolution constituting means to cause a squeezing and compaction of initially incandescent portion of a cigarette in order to prevent a scattering of ashes after extinction, said capsule ending into a substantially hemispherical vault, said substantially hemispherical vault comprising spherical sectors connected by a plane portion, said inner wall of said capsule being polished and having at least one cross section diameter corresponding substantially to that of a cigarette, and said capsule being fixedly connected to a bottom of a body of said cigarette-lighter and having a depth of 5–15 mm.

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**5,035,251**

## HAIR TREATMENT MEDIA APPLICATION DEVICE

**Detlef Hollenberg, Hilden; Hans Schneider, Schwalmtal, and Georg Weihrauch, Wald-Michelbach, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschft auf Aktien, Duesseldorf, Fed. Rep. of Germany**

**Filed Jan. 26, 1988, Ser. No. 148,411**

**Claims priority, application Fed. Rep. of Germany, Jan. 26, 1987, 3702165**

**The portion of the term of this patent subsequent to Nov. 21, 2006, has been disclaimed.**

**Int. Cl.[5] A45D *24/22***

**U.S. Cl. 132—112** **9 Claims**

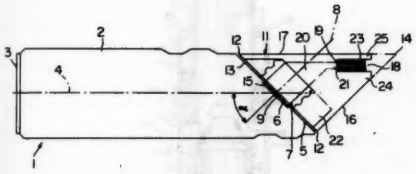
1. A device for the application of a hair treatment medium, said device comprising:

(A) a container for the hair treatment medium, said container having a top opening and a vertical central axis, said top opening being surrounded by a planar container face

and being disposed at a 45° angle to said vertical central axis, said container being adapted to form a handle for the device;

(B) an applicator head rotatably mounted on the container top opening, said applicator head having a media dispensing mouth, an axis of rotation, and a planar base which adjoins said container face when said applicator head is mounted upon said container, so that the axis of rotation of said applicator head intersects the vertical axis of said container approximately in the plane of said container face;

(C) passage means within the applicator head communicating between the dispensing mouth of the applicator head and the interior of the container, so that hair treatment medium may flow from the container, through the applicator head and out its dispensing mouth; and



(D) dispensing means located at the dispensing mouth for applying hair treatment medium directly to the hair, said dispensing means comprising a plurality of outwardly projecting bristles surrounding the dispensing mouth, and one or more guide tines adjacent and parallel to the bristles outward from the dispensing mouth, the length of the bristles being not more than the length of the guide tines, said bristles and guide tines being so disposed on said applicator head that as said applicator head is rotated around its axis to the extent permitted by its mounting, said bristles and guide tines assume at one point during the rotation an orientation parallel to the vertical axis of the container and at one other point during the rotation an orientation perpendicular to the vertical axis of the container.

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**5,035,252**

**NICOTINE-CONTAINING DENTAL FLOSS**

**Steven J. Mondre, 370 E76 B1501, New York, N.Y. 10021**

**Filed Dec. 14, 1990, Ser. No. 627,657**

**Int. Cl.[5] A61C *15/00*; A24F *47/00***

**U.S. Cl. 132—321** **19 Claims**

1. An article of manufacture comprising dental floss having a substantially uniformly dispersed amount of nicotine, a nicotine derivative or nicotine-containing compound.

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**5,035,253**

**TENT CANOPY RAIN AWNING**

**Allan D. Bortles, 1523 Ontario Dr., Janesville, Wis. 53545**

**Filed Oct. 30, 1989, Ser. No. 405,895**

**Int. Cl.[5] E04H *15/08***

**U.S. Cl. 135—89** **20 Claims**

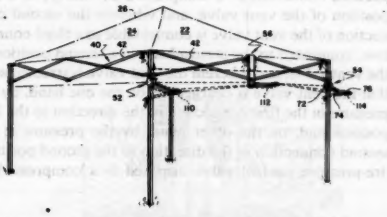
1. A detachable tent canopy rain awning for a portable tent canopy having a roof supported by a brace network and vertical legs, said awning comprising:

a plurality of support members, each support member including,

means for attaching the member to a vertical leg of the brace network of the canopy, and an arm extending from said means for attaching the member outwardly beyond an outer edge of the canopy roof; and

a sheet of material adapted for engaging said support members, to be held by said arms and positioned by said arms for receiving and collecting runoff from the edge of the canopy roof and conducting the runoff toward an end of the sheet of material,

said sheet of material being disposed over and between said arms to define a generally horizontally disposed surface for collecting runoff from the roof,



said sheet of material and said arms further defining a water retaining lip restricting runoff collected on said generally horizontally disposed surface from cascading off said awning along the edge between said vertical legs and directing the collected runoff toward an end of the awning near a vertical leg.

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**5,035,254**

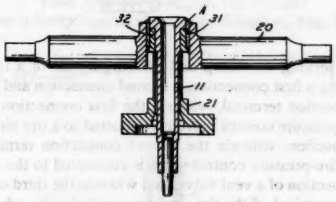
**POWER TRANSMISSION**

**Albert Blatter, Highland, and Robert E. Davis, Linden, both of Mich., assignors to Vickers, Incorporated, Troy, Mich.**

**Filed Mar. 22, 1990, Ser. No. 497,394**

**Int. Cl.[5] F15B *13/043***

**U.S. Cl. 137—85** **8 Claims**



1. In an electrohydraulic servovalve comprising a torque motor including flapper moved by an armature, a servovalve having a spool valve, said torque motor receiving an electrical signal and positioning the flapper between a pair of opposed nozzles to control the spool valve and a feedback spring tube connected to the flapper and to the spool of the spool valve, said electrohydraulic servovalve having a normal operating temperature range, the improvement comprising

a one part heat curing thermosetting adhesive securing said spring tube in said armature,

said thermosetting adhesive being of the type which is curable within the normal operating range of the electrohydraulic servovalve.

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**5,035,255**

**DEVICE FOR CHANGING THE PRESSURE IN A TIRE OF A MOTOR VEHICLE**

**Hartmut Geiger, Garbsen, Fed. Rep. of Germany, assignor to Wabco Westinghouse Fahrzeugbremsen GmbH, Hannover, Fed. Rep. of Germany**

**Filed Mar. 19, 1990, Ser. No. 495,323**

**Claims priority, application Fed. Rep. of Germany, Mar. 17, 1989, 3908807**

**Int. Cl.[5] F16K *11/10***

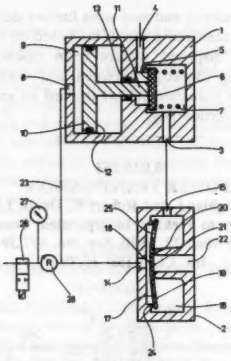
**U.S. Cl. 137—102** **12 Claims**

1. A device for changing the pressure in tires of a motor vehicle, comprising

a compressed-air source, wherein the level of the discharge pressure of the compressed-air source can be adjusted;

a vent valve having a first connection and a second connection, wherein the vent valve is adjustable pressure-dependent and is constructed such that the second connection of the vent valve is connectable to the first connection, connected to a compressed-air source, in a first position of the vent valve, and wherein the second connection of the vent valve is connectable to a third connection, connected to the atmosphere, in a second position of the vent valve, and wherein the vent valve is structed such that the vent valve is chargeable, on the one hand, by the pressure in the first connection in the direction to the first position and, on the other hand, by the pressure in the second connection in the direction to the second position;

a tire-pressure control valve disposed in a compressed-air



line serving for filling and discharging air of a tire and having a first connection, a second connection and a third connection terminal, wherein the first connection of the tire-pressure control valve is connected to a tire air-filling connection, wherein the second connection terminal of the tire-pressure control valve is connected to the second connection of a vent valve, and wherein the third connection terminal of the tire-pressure control valve charges a control element, first as an actuating piston, with a pressure of the compressed-air source for actuating and maintaining open a valve device, comprised of a valve seat and a closure body, against a restoring force furnished by a valve spring;

a valve device incorporated in the tire-pressure control valve, where two connections of the tire-pressure control valve are connectable to each other via the operation of the valve device.

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**5,035,256**

## TWO-WAY VALVE FOR FITTING TO THE DOWNSTREAM END OF A FLUID DISTRIBUTION PIPE ADAPTED TO BE CLEANED BY SCRAPING

**Eugene Le Devehat, Saligny, France, assignor to FMC Corporation, Chicago, Ill.**

**Filed Dec. 20, 1989, Ser. No. 453,723**

**Claims priority, application France, Dec. 20, 1988, 88 16845**

**Int. Cl.[5] B08B *9/04***

**U.S. Cl. 137—242** **8 Claims**

1. A two-way valve apparatus for a liquid distribution pipe adapted to be cleaned by scraping, said valve comprising:

(a) a tube adapted for connection to the distribution pipe;

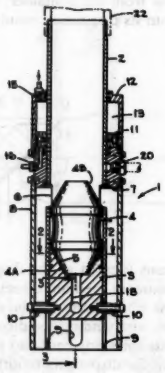
(b) a mobile abutment member within the tube and adapted to receive a scraper in abutting relationship therewith after the scraper has traveled along the liquid distribution pipe by a liquid therein and performed a cleaning function;

(c) at least one port in the tube on the upstream side of the abutment member;

(d) a sleeve surrounding the tube and slidably movable longitudinally thereon between a closed position in which the sleeve shuts off the port and an open position in which at least part of the port is exposed;

(e) control means for controlling movement of the sleeve with respect to the tube;

(f) a tubular confinement member surrounding the abutment member, said confinement member fastened to the abutment member and the sleeve so that said members and said sleeve move longitudinally as a unit with respect to the tube; and



(g) reverse flow pressure injection means discharging into the abutment member for returning the scraper to its original position within the liquid distribution pipe after the liquid distribution pipe has been cleaned by the scraper; the sleeve, the abutment member and the port longitudinally spaced so that when the sleeve is in its open position the abutment member is both (1) farther upstream than when the sleeve is in its closed position and (2) located a sufficient distance from the port to enable the scraper to come into abutting relationship with the abutment member without closing off the port.

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**5,035,257**

## TOILET TANK VALVE

**Bruce A. Antunez, Glendora, Calif., assignor to Coast Foundry & Manufacturing Co., Inc., Pomona, Calif.**

**Filed Apr. 25, 1990, Ser. No. 515,489**

**Int. Cl.[5] F16K *31/18, 33/00***

**U.S. Cl. 137—414** **7 Claims**

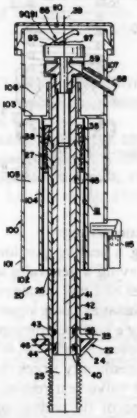
1. A toilet tank valve having a vertical axis, and a riser adapted to be fitted in a toilet tank to supply water, said riser having a central passage with a smooth internal wall for a substantial portion of its axial length, said riser further including a collet thread and a plurality of flexible collet fingers;

a collet nut having an internal tapered compression surface adapted to compress said collet fingers toward said axis, and a thread engageable to said collet thread, said collet nut further including axially-extending external splines;

a slider tube fitted in said riser, said riser tube having a plurality of peripheral grooves spaced apart from one another in the outer wall of said slider tube, whereby the collet fingers can be engaged in a selected one of said grooves;

a valve mechanism fixed to the outlet end of said slider tube and receiving water from its said valve mechanism including an inlet port, an inlet seat around said inlet port, exhaust ports laterally spaced from said inlet seat, a flexible diaphragm cooperating with said valve seat, said dia-

phragm forming a flow chamber and a bias chamber, there being a bias port through said diaphragm in fluid communication with said inlet port, a vent port from said bias chamber to atmosphere, a vent seat surrounding said vent port, a valve ball adapted to fit against and close said vent port and to moved away from it to open the vent port for moving said flexible diaphragm toward and away from said valve seat and a lever actuator pivotally mounted to the valve mechanism having an actuator pin movable into said vent port to displace said valve ball, leaving a clearance to vent the bias chamber for moving said flexible diaphragm away from said valve seat;



an inverted cup float slidingly fitted around said riser, said float including a sleeve having axially extending splines to engage the splines on said collet nut, whereby turning said float can tighten or loosen said collet nut as desired to enable adjustment of the slider tube in the riser to select different liquid levels, and a cap on said float having a contact surface to contact the actuator when the water level is lower than a predetermined liquid level.

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**5,035,258**

## VALVE WITH REMOVABLE INSERT

**David Garnham, Rothwell, England, assignor to Cooper Industries, Inc., Houston, Tex.**

**Filed Jul. 19, 1990, Ser. No. 555,055**

**Claims priority, application European Pat. Off., Nov. 8, 1989, 89311556.8**

**Int. Cl.[5] F16K *27/04***

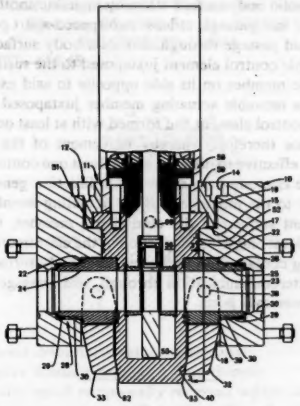
**U.S. Cl. 137—454.2** **14 Claims**

1. A valve arrangement, comprising:

a body portion removably receivable in a receptacle portion, the body portion including valve elements for controlling fluid flow through a flowpath in the body portion and the receptacle portion including flowpaths which, when the body portion is received in the receptacle portion, communicate with the flowpath in the body portion,

annular sealing members disposed in the opening of each receptacle flowpath, each sealing member being movable axially in its opening, and

means coupled to said sealing member, and engagable by said body portion when it is inserted into said receptacle portion to urge said sealing members into sealing engagement with the surface of the body portion.



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**5,035,259**

## FLUID FLOW CONTROL VALVE

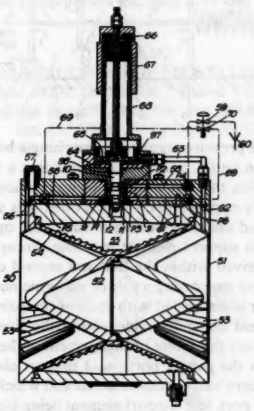
**William P. Allen, Staine, and Peter Miles, Crowthorne, both of England, assignors to Chubb Fire Limited, England**

**Filed Aug. 16, 1990, Ser. No. 568,387**

**Claims priority, application United Kingdom, Aug. 19, 1989, 8918960**

**Int. Cl.[5] F16K *7/06, 7/07, 31/128***

**U.S. Cl. 137—488** **13 Claims**



1. A main fluid flow control valve of the kind comprising an inlet and outlet separated by an impervious central barrier on a pervious support structure; a flexible sleeve surrounding said structure; an annular control chamber surrounding said sleeve; and control means for controlling the admission and release of fluid to and from said control chamber, whereby the flexible sleeve is held in sealing contact with the barrier to prevent fluid flow from said inlet to said outlet or is released from the barrier to permit fluid flow from said inlet to said outlet, in dependence upon the volume of fluid within said control

chamber; wherein said control means comprise a pilot valve comprising: a solid body having a surface which defines one boundary wall of a passage for fluid flow; an elastomeric member mounted with an exterior surface thereof facing but spaced from said solid body surface whereby to define another boundary wall of said passage; at least two spaced-apart ports opening into said passage through said solid body surface; at least one movable control element juxtaposed to the surface of said elastomeric member on its side opposite to said exterior surface; and a movable actuating member juxtaposed to said at least one control element and formed with at least one selected cam surface therefor; whereby movement of the actuating member is effective to displace said at least one control element against the elastomeric member, in a direction generally perpendicular to the movement of the actuating member and to the adjacent surface of the elastomeric member, thereby to deform at least one selected portion of the elastomeric member into sealing contact with the facing solid body surface so as to control intercommunication through said passage for fluid flow between said ports.

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**5,035,260**

## LINE PRESSURE REGULATOR

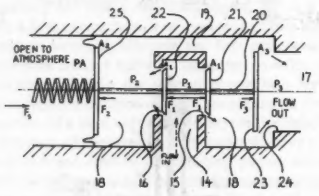
**Kenneth J. Davey, Bassendean, Australia, assignor to Fluid Technology Limited, Australia**

**Filed Nov. 22, 1989, Ser. No. 440,658**

**Claims priority, application Australia, Feb. 27, 1989, PJ2965**

**Int. Cl.[5] G05D *16/06***

**U.S. Cl. 137—505.18** **3 Claims**




1. An in-line pressure regulator comprising a housing having an inlet and an outlet, said housing providing a first chamber open to the inlet, the first chamber being provided with a pair of substantially opposed ports which open to a second chamber, the second chamber having a third port opening to the outlet, an axial support element movable through the pair of ports and received within the first and second chambers, the support element supporting a pair of valve members wherein a valve member is associated with each of the pair of ports, the support element being movable within the first and second chambers to vary the extent of engagement of the pair of valve members with the pair of ports, said support element further supporting a third valve member at one end which is associated with the third port, said support element being biased to an end position at which the pair of ports are open, and the third port is closed, said support element further supporting a pressure surface at the other end which is in the second chamber, whereby the force exerted by fluid pressure in the second chamber on the support element counteracts the biasing force applied thereto to rapidly move the support element from its end position to a regulating position where the pair of valves are moved proximate their respective ports to vary the degree of opening of the ports in accordance with the fluid pressure applied at the inlet.

**5,035,261**

## PUMP AND VALVE APPARATUS

**Yoshinobu Koiwa, Chiba, Japan, assignor to Yoshinobu Koiwa; Kabushiki Kaisha Little Rock, both of Chiba; Kelbin Co., Ltd., Tokyo and Shuichi Fujimori, Fujishawa, all of, Japan**

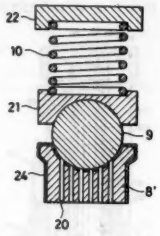
**Division of Ser. No. 247,869, Sep. 21, 1988, Pat. No. 4,948,349.**

**This application Apr. 23, 1990, Ser. No. 513,858**

**Claims priority, application Japan, Sep. 22, 1987, 62-237996**

**Int. Cl.[5] F16K *15/04***

**U.S. Cl. 137—516.11** **48 Claims**




1. A valve device comprising:

a valve seat having a seating portion which has a recess defined therein having a generally spherical surface;

a prescribed number of fluid passages being formed in the valve seat, said passages being open into the recess;

a valve-piece having a surface corresponding to the surface of the valve seat recess; and

a valve spring that resiliently urges the valve-piece toward the surface of the valve seat recess;

wherein at least one of the valve seat and valve-piece is formed of a hard resilient material.

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**5,035,262**

## DEVICE FOR MIXING LIQUIDS

**Walter Schweikert, Postfach 13 09, 7310 Plochingen, Fed. Rep. of Germany**

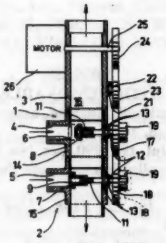
**PCT No. PCT/DE88/00263, § 371 Date Dec. 7, 1989, § 102(e) Date Dec. 7, 1989, PCT Pub. No. WO88/08745, PCT Pub. Date Nov. 17, 1988**

**PCT Filed May 5, 1988, Ser. No. 449,822**

**Claims priority, application Fed. Rep. of Germany, May 9, 1987, 3715563**

**Int. Cl.[5] F16K *11/22***

**U.S. Cl. 137—607** **12 Claims**




1. A mixing faucet for mixing liquids, having a housing, a valve block with at least first and second valve members each of which include a flow cross section that includes a valve seat, each of said valve members may be movable independently of each other by use of separate valve shafts, each valve member controls one flow cross section, wherein a change in flow cross section is effected by rotation of the valve shafts of the movable valve members via a drive means, said drive means having drive gear wheels disposed outside the valve housing and

aligned in a plane that mesh with one another and are secured to the shafts of the movable valve members and serving as a coupling between the valve members, which upon adjustment of said first valve member effects a simultaneous adjustment of said second valve member, wherein on the basis of a gear ratio of the coupling, a cross-sectional change at said second valve member differs from the cross-sectional change made at the first valve member, and at least one of said drive gear wheels secured to the valve shafts (12) is provided with tooth gaps that effect a disengagement of the drive gear wheels secured to the valve shafts in order to effect a temporary rotational interruption at at least one of the gear wheels.

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**5,035,263**

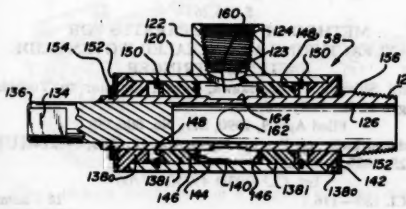
## ROTARY BEARING SEAL

**W. Harry Mathews, Arvada, Colo., assignor to Mark VII Equipment, Inc., Arvada, Colo.**

**Division of Ser. No. 446,278, Dec. 14, 1989, abandoned, which is a continuation-in-part of Ser. No. 367,505, Jun. 16, 1989, abandoned. This application Apr. 4, 1990, Ser. No. 504,618**

**Int. Cl.[5] F16L *27/00***

**U.S. Cl. 137—615** **10 Claims**




1. An element for delivering fluid from a stationary source to a rotating receptacle comprising in combination,

a rigid fluid impervious sleeve having a side wall and opposite open ends, said side wall having an interior surface and a lateral opening through the side wall communicating with the interior of the sleeve, and a connector in communication with said lateral opening, said connector being suitable for connection to said stationary source of fluid whereby fluid can be delivered through said lateral opening into the interior of said sleeve,

a hollow rotatable shaft disposed in said sleeve for rotational movement relative to the sleeve, means on said rotatable shaft and cooperating with said sleeve for prohibiting relative axial movement between said hollow shaft and the sleeve, said rotatable shaft having a cylindrical side wall with an exterior surface in opposed confronting relationship with the interior surface of the sleeve and including means for connection to a rotatable drive source, means for connecting the hollow rotatable shaft to said rotating receptacle such that the rotating receptacle is in fluid communication with the interior of the hollow shaft, and a transverse opening in said cylindrical side wall, and

a pair of spaced bearing seal members disposed in the interior of said stationary sleeve in continuous fluid tight engagement with said interior surface of the side wall of the sleeve and with the exterior surface of the rotatable shaft, each of said spaced bearing-seal members constituting a single element that continuously functions as a bearing between said sleeve and the hollow rotatable shaft as a fluid-tight seal between the sleeve and the hollow rotatable shaft, said bearing-seal members being disposed on opposite sides of said lateral and transverse openings so as to define a chamber between said sleeve and rotatable shaft which is in communication with the lateral and transverse openings whereby fluid entering the coupling through said stationary source can be delivered to the rotating receptacle without fluid loss.

**5,035,264**

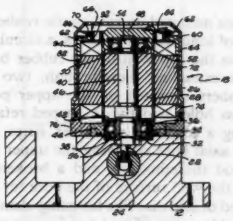
## ADJUSTABLE STATOR RETAINER ASSEMBLY

**Russell P. Amico, Castaic, and George M. Klier, Granada Hills, both of Calif., assignors to HR Textron Inc., Valencia, Calif.**

**Filed Sep. 27, 1990, Ser. No. 588,918**

**Int. Cl.[5] F15B *13/044***

**U.S. Cl. 137—625.65** **14 Claims**



1. A direct drive servovalve comprising:

(1) a valve housing defining a bore therein;

(2) a valve spool reciprocally received within said bore for movement to control fluid flow therethrough from a supply port;

(3) motor means having a rotor and a stator and including a drive member for engagement with said valve spool at a predetermined point to move said valve spool in said bore;

(4) said rotor including an isolation tube having a closed end;

(5) said stator surrounding said isolation tube;

(6) retainer means disposed adjacent said closed end of said isolation tube and including first alignment means;

(7) said stator including second alignment means for cooperatively engaging said first alignment means for positioning said stator relative to said rotor;

(8) means securing said retainer means to said isolation tube adjacent said closed end thereof for clamping said stator in place; and

(9) separate cover means disposed over said motor means.

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**5,035,265**

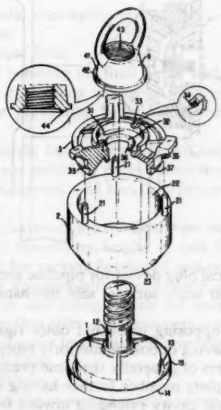
## STRUCTURE OF PIPE PLUG

**Chung F. Chen, 26272 Tarrasa La., Mission Viejo, Calif. 92691**

**Filed Dec. 28, 1989, Ser. No. 458,026**

**Int. Cl.[5] F16L *55/10*; B65D *59/02***

**U.S. Cl. 138—89** **1 Claim**



1. A pipe plug for sealing the orifice of a pipe,including: a

disc-like fastening element, comprising a base plate having a peripheral circular groove in a face of said plate, the groove having a radially inwardly tapered wall portion, and a threaded rod upstanding therefrom in the center of the circle defined by the groove;

an elastic rubber band mounted on said fastening element, comprising an inwardly tapered bottom end, and a plurality of flexible rubber pins upstanding from the top wall surface thereof, the tapered end being received in the groove;

a pressure plate mounted on said elastic rubber band having a plurality of longitudinal grooves, a circular bottom end inserted into the top wall of the rubber band, an upper recess hole extending therethrough, two L-shaped retainer members mounted on the upper portion of said upper recess hole, said two L-shaped retainer members each having a plurality of convex strips on its bottom surface, an axial bore receiving the upper portion of the threaded rod therethrough, and a broken convex strip portion on the wall surface of the bore for centering said threaded rod of said disc-like fastening element in the axial bore, the rubber pins of said band being received in the longitudinal grooves of said pressure plate; and

a lifting eye, comprising an inner thread portion receiving upper portion of the threaded rod of said fastening element, and a bottom flange having several convex strips thereon;

characterized in that the convex strips of said lifting eye engage and disengage the convex strips of said pressure plate to produce a striking sound, during the turning of said lifting eye on said threaded rod to loosen said elastic rubber band, so as to indicate the loosening of said elastic rubber band.

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**5,035,266**

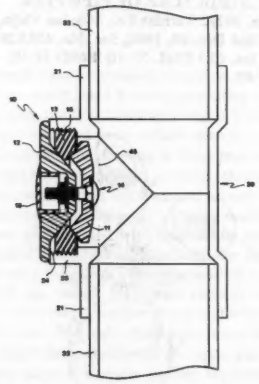
## MECHANICAL PLUG FOR CLEAN-OUT TEES

**Bryan R. Benson, North Branch, and Marc P. Bevacco, New Hope, both of Minn., assignors to Cherne Industries Incorporated, Minneapolis, Minn.**

**Filed Dec. 11, 1989, Ser. No. 451,012**

**Int. Cl.[5] F16L** *55/10, 21/04*

**U.S. Cl. 138—92** **14 Claims**



1. A mechanical plug device for pipeline access ports having a small threaded inner surface, said mechanical plug device comprising:

(a) spacially opposing inner and outer rigid circular plate members having opposing interiorly tapered circumferential shoulders of generally the same predetermined slope, said inner plate member further having an outer surface and a central cavity extending inward from said tapered circumferential shoulder, and said outer plate member further having an outer surface and an inner surface having an outwardly extending central structure from said tapered circumferential shoulder for movement into said central cavity of said inner plate member, said circumferential shoulder of said outer plate having a radial length longer than the radial circumferential shoulder length of said inner plate,

(b) an elastomeric radially expandable O-ring structure having an outer circumferential surface of a prethreaded configuration to substantially match the threaded inner surface of a pipeline access port, said O-ring structure further having an inner circumferential generally V-shaped bottom cross-section defining inclined surfaces, said inclined surfaces having generally the same said predetermined slope as said tapered shoulders of said opposing inner and outer plate members, and

(c) adjustable lateral force means operative between said inner and outer plate members, whereby the positive adjustment of said lateral force means causes said opposed plate member circumferential shoulders to slidingly engage said O-ring inclined surface structure to cause said O-ring outer circumferential surface to seal against the threaded inner surface of the access port.

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**5,035,267**

## METHOD OF AND APPARATUS FOR MANUFACTURING A CONCEALED WOVEN SLIDE FASTENER STRINGER

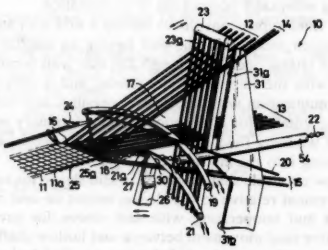
**Muchiji Shimono, Namerikawa, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan**

**Filed Apr. 9, 1990, Ser. No. 506,258**

**Claims priority, application Japan, Apr. 11, 1989, 1-42146[U]; Apr. 25, 1989, 1-104881**

**Int. Cl.[5] D03D** *49/50, 41/00*

**U.S. Cl. 139—116.1** **16 Claims**



1. A method of manufacturing a woven slide fastener stringer, comprising the steps of:

(a) weaving a stringer tape with a group of foundation warp threads, a group of fixing warp threads and a single weft thread progressively at a fell, said foundation warp threads and said weft thread jointly constituting a web portion of said tape and said fixing warp threads extending along one longitudinal edge of said tape;

(b) forming upper and lower sheds between said groups of warp threads;

(c) inserting said weft thread in said upper shed and introducing an element-forming filamentary material in said lower shed along a path extending substantially parallel to said warp threads; and

(d) coiling said element-forming filamentary material into a row of coupling elements each having a coupling head portion, substantially superimposed upper and lower leg portions and a heel portion as said filamentary material is woven into said stringer tape along said one longitudinal edge thereof in synchronism with the weaving of said stringer tape; said coiling step including hooking said element-forming filamentary material with said heel por-

tion oriented to project transversely beyond said one longitudinal edges of said stringer tape and with said head portion directed toward said web portion of said stringer tape.

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5,035,268

**PICKING BELT FOR A GRIPPER WEAVING MACHINE**

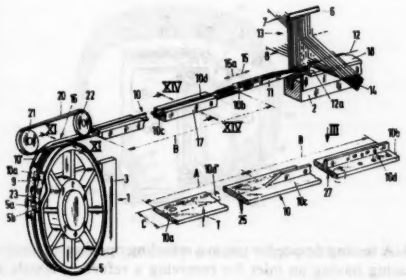
**Robert Bucher, Frick, Switzerland, assignor to Sulzer Brothers Limited, Switzerland**

**Filed Jul. 21, 1989, Ser. No. 384,174**

**Claims priority, application Switzerland, Jul. 22, 1988, 2817/88**

**Int. Cl.[5] D03D *47/24***

**U.S. Cl. 139—449** **18 Claims**



17. A picking mechanism in a gripper weaving machine comprising

an oscillating belt wheel;

a gripper head for reciprocating into and out of a shed of warp yarns;

a flexible belt secured at one end to said wheel for winding thereon and at a second end to said gripper head for reciprocating said head, said belt including a plastic body having at least one longitudinally extending slot-like recess in at least one surface thereof and a longitudinally extending insert within said body, said insert being disposed in inwardly spaced relation to each outer surface of said body and including a plurality of longitudinally extending reinforcing fibers; and

a guide rail between said wheel and said gripper head slidably receiving an end portion of said belt, said belt being slidably guided in said rail and having at least one raised part on said end portion projecting from a surface of said body.

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5,035,269

**SAFETY GAS CYLINDER CONTAINMENT SYSTEM**

**Frank G. Pytryga, Arnold, Md., and Martin Prince, Wayne, N.J., assignors to Emergency Containment Systems, Wayne, N.J.**

**Division of Ser. No. 933,160, Nov. 21, 1986, Pat. No. 4,802,515. This application Feb. 3, 1989, Ser. No. 305,908**

**Int. Cl.[5] B65B *31/00*; G67B *7/24***

**U.S. Cl. 141—1** **10 Claims**

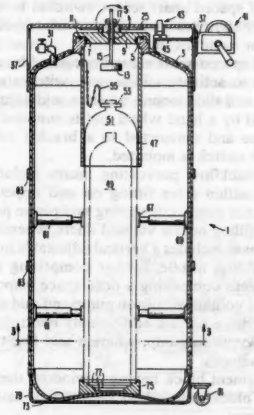
1. A method of handling of leaking containers of hazardous gas, liquids and the like, comprising:

a) providing a containing unit for receiving containers,

b) placing a container in the containment unit,

c) retaining the container in the containment unit against movement in any position,

d) sealing the containment unit to retain hazardous contents therein, and



e) treating the contents emanating from the leaking container without puncturing the container and removing any existing hazard.

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5,035,270

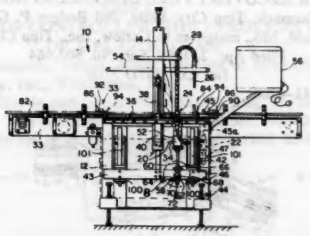
**AUTOMATIC CONVEYORIZED CONTAINER FILLER**

**Kenneth J. Herzog, 200 Mill Rd., Riverhead, N.Y. 11901**

**Filed Nov. 8, 1989, Ser. No. 433,114**

**Int. Cl.[5] B65B *3/12***

**U.S. Cl. 141—116** **4 Claims**



1. An automatic conveyorized volumetric container filler which comprises:

(a) a reservoir of fluid;

(b) means for pumping the fluid out of said reservoir;

(c) means for controlling volume of the fluid pumped;

(d) means for preventing backflow of the fluid into said reservoir;

(e) a filling nozzle fluidly connected to said backflow preventing means including ducts connecting said reservoir, said pumping means, said backflow preventing means and said nozzle;

(f) a container for receiving the fluid from said filling nozzle;

(g) means for controlling height of said filling nozzle to compensate for varying heights of said container;

(h) means for automatically conveying a plurality of said containers to said filling nozzle for receiving the fluid therefrom so that after said containers are filled, they can be conveyed away to be capped; wherein said means for pumping includes:

(i) a support Frame;

(j) a volumetric piston pump having an upper end and a rod;

(k) a pump drive cylinder;

(l) a common drive bar connecting said pump drive cylinder and said volumetric piston pump; and

(m) a linear bearing guide shaft slide assembly for said drive bar; wherein said volume controlling means includes:

(n) a pair of spaced apart sensor switches in which one of said sensor switches is adjustable with respect to other of said sensor switches; and

(o) a pair of spaced apart actuators carried by said common drive bar to activate said sensor switches so as to limit stroke of said slide mount; wherein said adjustable switch is adjusted by a hand wheel and is mounted on said support frame and connected to a bracket on which said adjustable switch is mounted,

wherein said backflow preventing means includes a pair of check valves within a tee fitting on said upper end of said volumetric piston pump, connecting said piston pump with the reservoir and filling nozzle via said ducts, wherein said height controlling means includes a vertical adjustable nozzle rack for holding said filling nozzle, further comprising a fine tuning adjustment means comprising a dead space disposed between said rod of said volumetric piston pump and said slide mount of said common drive bar for additionally controlling stroke of said volumetric piston pump, wherein said fine tuning adjustment means includes:

(a) an adjustment block having a window therein, said adjustment block coupled to said rod of said volumetric piston pump;

(b) a scale disposed onto said adjustment block adjacent said window;

(c) a nylon shoe within said adjustment block and viewed through said window so that said scale can be read from top of said nylon shoe;

(d) a toggle shoe clamp threaded into bottom of said adjustment block to raise and lower said nylon shoe; and

(e) a lock nut threadably disposed onto said toggle shoe clamp for locking the setting of said nylon shoe.

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**5,035,271**

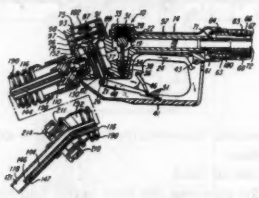
## VAPOR RECOVERY FUEL DISPENSING NOZZLE

**Paul D. Carmack, Tipp City, Ohio, and Rodger P. Grantham, Springfield, Mo., assignors to Catlow, Inc., Tipp City, Ohio**

**Filed Apr. 2, 1990, Ser. No. 503,464**

**Int. Cl.[5] B67D *5/06***

**U.S. Cl. 141—206** **22 Claims**



1. A dispensing nozzle assembly adapted for use with a vapor recovery fuel dispensing system including flexible hoses defining a liquid fuel supply passage and a return vapor passage, said nozzle assembly comprising a nozzle body, an elongated fuel supply spout extending from said body, means defining a primary fuel supply passage and a return vapor passage extending from said spout through said body and for forming extensions of the corresponding passages within the hoses, a manually actuated fuel control valve within said fuel supply passage within said body, means for automatically closing said fuel control valve in response to the presence of fuel adjacent said spout, pressure responsive check valve means within said fuel supply passage downstream of said control valve and adjacent said spout, means for normally biasing said check valve means towards a closed position, said check valve means defining a first venturi suction passage connected to actuate said means for automatically closing said fuel control valve, means defining a second venturi suction passage extending from said check valve means, means for separating said first and second venturi passages of said check valve means, and means defining a fuel evacuation passage extending from said second venturi passage through said nozzle body and into the return vapor passage within the hoses for efficiently aspirating fuel condensed from vapor and accumulated within the return vapor passage within the hoses into the fuel flowing within said spout and for minimizing the fuel flow restrictions within the hoses and said nozzle assembly.

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**5,035,272**

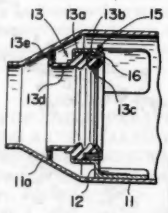
## DEVICE FOR SEALING REFUELING OPENING

**Ritsuo Kawase, Ogasa, Japan, assignor to NOK Corporation, Tokyo, Japan**

**Continuation of Ser. No. 229,977, Aug. 9, 1988, abandoned. This application Jan. 9, 1990, Ser. No. 463,017**

**Int. Cl.[5] B67D *5/04***

**U.S. Cl. 141—312** **4 Claims**




4. A sealing device for use in a refueling opening, comprising a casing having an inlet for receiving a refueling nozzle and inner and outer peripheral surfaces, an elastic seal member adapted to receive a fueling nozzle when refueling, said elastic seal member being impervious to fuel or vapors and providing a seal between said casing and said fueling nozzle when refueling, said elastic seal member having a retaining portion mounted in a seal retaining member which is attached to said inner surface of said casing, said elastic seal member further having a cantilevered portion extending from said retaining portion in a direction parallel to a direction of insertion of said fueling nozzle said cantilevered portion and said retaining member being arranged to define a gap therebetween, said cantilievered portion having a sealing surface and a gap facing surface on opposite sides thereof, both of said sealing surface and said gap facing surface extending along the length of said cantilevered portion, said sealing surface having at least one seal lip thread adapted to sealingly engage an inserted fueling nozzle, said elastic seal member further having a casing contacting portion extending from said retaining portion and sealingly engaging the inner surface of said casing, whereby said cantilevered annular portion is deflected outwardly when said fueling nozzle is being inserted.

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**5,035,273**

## VEHICLE WHEEL RIM DEVICE FOR MOUNTING A FIRST TIRE CASING INWARDLY OF A SECOND TIRE CASING, PROVIDING A SAFETY EMERGENCY WHEEL DEVICE

**Francesco Ruvio, 19-22 E. 28th St., Brooklyn, N.Y. 11229**

**Filed Sep. 21, 1987, Ser. No. 98,566**

**Int. Cl.[5] B60C *5/22, 17/01*; B60B *21/10, 23/00***

**U.S. Cl. 152—340.1** **8 Claims**

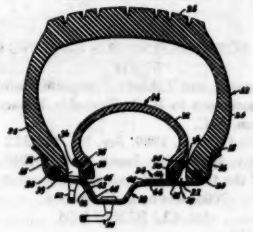
1. A vehicle wheel rim device for a first wheel rim which carries a first tire casing, the first wheel rim having a pair of generally circular edge-portions having inwardly-facing faces, and the first tire casing having a pair of circular bead-portions to be supportedly carried respectively on the inwardly-facing faces of the circular edge-portions of the said first wheel rim, the said first rim having a generally cylindrical body portion

extending between the said edge-portions of the said first rim,

the said first tire casing having a generally circular body portion, its portions along its circumference being of a general U-shape in transverse cross-section, extending between and including the first tire casing's bead portions,

the said device provided also with a second tire casing inwardly of the said first tire casing, the second tire casing also having a pair of circular bead portions and a generally circular body portion, and its portions along its circumference being of a general U-shape in transverse cross-section, extending between and including the said second tire casing's said bead portions,

the device having a second rim means inwardly of the first rim, generally circular in shape, having a pair of generally circular edge-portions having inwardly-facing faces, and supportedly connected to the generally cylindrical body portion of the first rim, with the generally circular edge-portions of the second rim means spaced respectively



from the adjacent generally circular edge-portions of the first rim,

the said generally circular edge-portions and their inwardly-facing faces, of the second rim means, providing support for the bead-portions of the second tire casing in a manner in which, when the first tire casing and the second tire casing are assembled into supported positions on the respective inwardly-facing faces of the edge-portions of the respective first rim and the second rim means, the second tire casing's bead portions are substantially spaced from the bead portions of the first tire casing,

the second rim means being provided to be of two separate and non-integral portions, each generally circular, and respectively supportedly connected to transversely-spaced portions of the generally cylindrical body portion of the first wheel rim but not integral therewith, then permanently jointed thereto,

in a combination in which the said first wheel rim and its generally circular edge-portions are symmetric.

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**5,035,274**

## WHEEL/TIRE INFLATOR

**John F. Kinnick, Troy, and Frank E. Lashier, Jr., Sterling Heights, both of Mich., assignors to Dominion Tool & Die Co., Inc., Roseville, Mich.**

**Filed Oct. 1, 1990, Ser. No. 591,049**
**Int. Cl.[5] B60C *25/00***
**U.S. Cl. 157—1.1** **13 Claims**

1. An improved inflator for automatically inflating wheel/tire assemblies comprising:

a reciprocating inflator head movable into engagement with a wheel/tire assembly, said inflator head including a first portion operative to sealingly engage the sidewall of said tire and a second portion operative to sealingly engage said vehicle wheel, said first and second portions cooperating with said wheel and said tire to define a sealed chamber in fluid communication with the interior of said tire;

a reservoir of compressed air;

first and second supply lines extending from said reservoir to said sealed chamber;

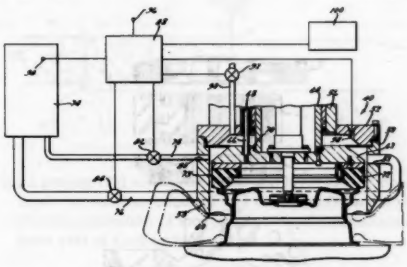
first and second valve means provided in said first and second supply lines respectively for selectively controlling flow of said compressed air to said wheel/tire assembly;

a bleed line in fluid communication with said sealed chamber;

bleed valve means selectively operative to place said sealed chamber in fluid communication with the atmosphere;

central control means;

first temperature sensing means operative to provide a signal to said central control means indicative of the temperature of said compressed air in said reservoir; and



second temperature sensing means operative to provide a signal to said central control means indicative of the ambient temperature;

said central control means being operative to adjust a base inflation pressure to compensate for differences in the sensed ambient temperature and temperature of said compressed air from a reference temperature for said base inflation pressure and to thereafter control said first and second valve means and said bleed valve means to inflate said tire to said adjusted base inflation pressure.

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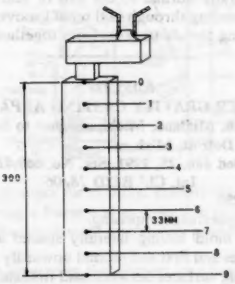
**5,035,275**

## METHOD OF CONTROLLING THE PYROLYSIS RATE OF A PLASTIC FOAM

**Takeshi Yamaguchi, Tokyo, Japan, assignor to Arco Chemical Technology, Inc., Wilmington, Del.**

**Continuation-in-part of Ser. No. 233,081, Aug. 17, 1988, abandoned. This application Oct. 25, 1989, Ser. No. 426,823**
**Claims priority, application Japan, Feb. 26, 1988, 63-42212**
**Int. Cl.[5] B22C *9/04***
**U.S. Cl. 164—34** **8 Claims**




1. A method which comprises:

pyrolyzing a plastic foam molding made from expandable plastic beads coated with from about 0.10 to 2.0 weight percent of a substantially water-insoluble inorganic siliceous material selected from the group consisting of silicates and polysilicates of sodium, potassium, magnesium, calcium, and aluminum;

wherein the pyrolysis rate and the rate of thermal shrinkage

of the plastic foam molding are controlled as desired by varying the amount of siliceous material coated on the beads.

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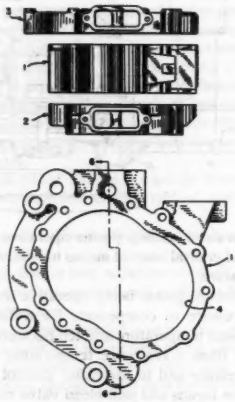
**5,035,276**

## EVAPORABLE FOAM PATTERN ASSEMBLY FOR CASTING A HOUSING FOR A ROTARY ENGINE

**William D. Corbett, and Benjamin L. Sheaffer, both of Fond du Lac, Wis., assignors to Brunswick Corporation, Skokie, Ill.**

**Filed Sep. 8, 1989, Ser. No. 404,746**
**Int. Cl.[5] B22C *7/02, 9/04***
**U.S. Cl. 164—34** **27 Claims**



1. An evaporable foam pattern assembly for casting, comprising an end housing pattern for a rotary engine, a pattern formed of an evaporable foam polymeric material and including a central opening, said central opening having a first generally cylindrical portion and a second portion having a non-circular cross-section, said pattern also having a generally rounded relief groove connecting said portions, said pattern having an internal air passage providing communication between said second portion and the periphery of said pattern, said pattern also having an internal water chamber extending partially around said opening and having an inlet opening and an outlet opening, said pattern being composed of two components having abutting surfaces disposed along a parting line extending generally normal to the axis of said opening, said parting line extending through said relief groove, and adhesive means for joining the abutting surfaces together.

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**5,035,277**

## COUNTER GRAVITY CASTING APPARATUS

**John G. Kubisch, Midland, Mich., assignor to General Motors Corporation, Detroit, Mich.**

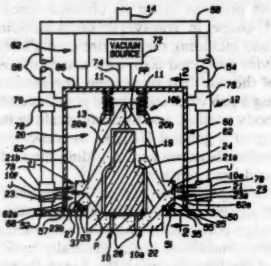
**Filed Jan. 25, 1991, Ser. No. 649,427**
**Int. Cl.[5] B22D *18/06***
**U.S. Cl. 164—255** **23 Claims**

1. Casting apparatus, comprising:

a) a casting mold having laterally spaced apart first and second sides and first and second upwardly facing, spaced apart sealing surfaces between said first and second sides,

b) a mold pick-up mechanism comprising first and second pick-up members supportively engaging the respective first and second sides of the mold, said first and second pick-up members each having an upwardly facing sealing surface disposed outboard of the respective first and second mold sides, and

c) a vacuum box having a pair of laterally spaced apart first walls overlying and sealingly engaged to the upwardly facing sealing surfaces on the pick-up members and a pair of spaced apart second walls interconnecting said first



walls and overlying and sealingly engaged to the upwardly facing sealing surfaces on the mold.

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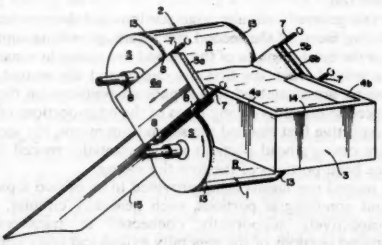
**5,035,278**

## APPARATUS FOR CONTINUOUS CASTING OF METAL STRIP

**Morihiro Hasegawa, and Takashi Yamauchi, both of Yamaguchi, Japan, assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.**

**Filed Oct. 2, 1989, Ser. No. 416,322**
**Claims priority, application Japan, Oct. 7, 1988, 63-251966**
**The portion of the term of this patent subsequent to Mar. 14, 2006, has been disclaimed.**
**Int. Cl.[5] B22D *11/06***
**U.S. Cl. 164—428** **4 Claims**



1. An apparatus for continuously casting a metal strip comprising:

a pair of internally cooled upper and lower rolls rotating in the opposite direction to each other and disposed parallel to each other at different levels with their axes held horizontal, the lower roll being below the upper roll;

a vessel for a pool of molten metal, at least a portion of the bottom or sides of said vessel slidably contacting the circumferential surface of said lower roll;

a pair of side dams disposed perpendicular to the axes of the rolls with a space therebetween approximately corresponding to the width of a metal strip to be cast so that at least a portion of the thickness of each dam may slidably contact the circumferential surfaces of the rolls, at least those portions of said side dams which come in slidable contact with the circumferential surfaces of the rolls being composed of a refractory material capable of being well abraded; and

mechanisms for forcibly feeding said side dams in the casting direction at a predetermined speed, thereby continuously casting molten metal into a metal strip through a gap between the pair of rolls while pressing said side dams against the rolls by said mechanisms and abrasively wearing said side dams with the circumferential surfaces of the rotating rolls.

## 5,035,279
## ARRANGEMENT FOR CONTINUOUSLY CASTING A CONTINUOUS METAL SHEET

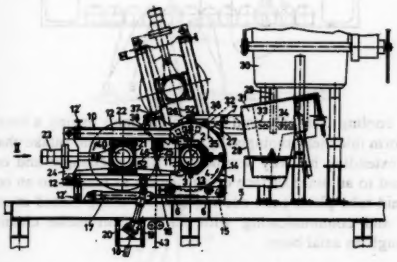
**Hermann Rametsteiner, Dornach; Karl Schwaha, Linz; Franz Hirschmanner, Linz, and Heinz Bramerdorfer, Linz, all of Austria, assignors to Voest-Alpine Industrieanlagenbau Gesellschaft m.b.H, Austria**

**Division of Ser. No. 296,533, Jan. 12, 1989, Pat. No. 4,960,164. This application May 14, 1990, Ser. No. 522,549**

**Claims priority, application Fed. Rep. of Germany, Jan. 26, 1988, 3802202**

**Int. Cl.[5] B22D** *11/06, 11/10*

**U.S. Cl. 164—428** **14 Claims**



1. An arrangement for continuously casting a continuous metal sheet comprising:

a) a first casting drum having a first casting drum axle and a second casting drum having a second casting drum axle, said first and second casting drums defining a casting gap therebetween;

b) a supporting framework adapted to rotatably support said second casting drum and a pivot means adapted to pivot said supporting framework about said first casting drum axle;

c) a vessel having a pouring spout wherein said pouring spout is adjustably positioned with respect to said first casting drum; and

d) limit means laterally covering said casting gap between said first and second casting drums, wherein said pouring spout is designed to abut on said first casting drum on the circumferential side thereof facing away from said second casting drum.

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## 5,035,280
## PROCESS AND APPARATUS FOR THE CONTINUOUS CASTING OF FINE METAL WIRE

**Didier Huin, Nancy, and Paul-Victor Riboud, Metz, both of France, assignors to Institut De Recherches De La Siderurgie Francaise, Puteaux, France**

**Filed Dec. 22, 1989, Ser. No. 455,063**

**Claims priority, application France, Dec. 22, 1988, 88 17366**

**Int. Cl.[5] B22D** *11/06*

**U.S. Cl. 164—463** **6 Claims**

1. In a process for continuous casting of fine metal wire, said process comprising the steps of

(a) melting a metal in a vessel;

(b) casting said metal out of said vessel by forming a jet of liquid metal; and

(c) quenching and solidifying said jet in a layer of cooling liquid deposited on a surface in motion;

the improvement consisting of:

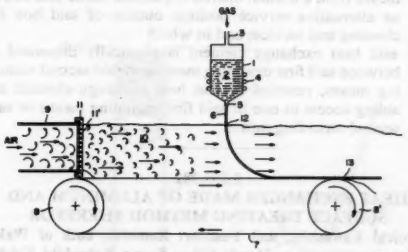
(d) accelerating the dispersal of the turbulence of said layer of said cooling liquid upstream of a point of impact of said jet on said layer of said cooling liquid, by breaking up eddies within said layer of said casting liquid into eddies of low amplitude.

2. Apparatus for continuous casting of fine metal wire, comprising

(a) a vessel (1) containing a liquid metal (2) equipped with a nozzle (5) through which a jet (6) of said liquid metal (2) flows off;

(b) a surface in motion, located underneath said nozzle (5);

(c) a feed pipe (9) depositing on said surface a layer (10) of cooling liquid on which said jet (6) of said liquid metal (2) is quenched and solidified; and



(d) a grating (11) arranged across said layer (10) of cooling liquid between an outlet of said feed pipe (9) and a point (12) of penetration of said jet (6) of liquid metal into said layer (10) of cooling liquid.

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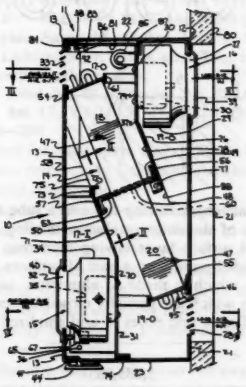
## 5,035,281
## HEAT EXCHANGER FOR COOLING AND METHOD OF SERVICING SAME

**Douglas L. Neuenfeldt, Coon Rapids, and Roger A. Peterson, Lake Township, Kanabec County, both of Minn., assignors to McLean Midwest Corporation, Brooklyn Partk, Minn.**

**Filed Sep. 7, 1989, Ser. No. 405,285**

**Int. Cl.[5] H01L** *23/467;* **F28D** *15/02*

**U.S. Cl. 165—76** **25 Claims**



1. A heat exchanger for cooling, comprising;

a) a box having a frame and an openable cover;

b) a heat exchange element operatively positioned within the box;

c) means for separating the element into heat expelling and heat extraction zones;

d) first air moving means in an operative position in the box for drawing and expelling a flow of ambient air in a passageway extending over said expelling zone;

e) second air moving means in an operative position in the box for drawing and expelling a flow of heat load air in a passageway extending through the extraction zone;

f) means for removing said heat exchange element from said

box when said cover is opened, enabling access to both sides of the element for easy cleaning thereof;

g) first mounting means inside of said box for moving said first air moving means from a normal operative position inside said box to an alternative service position outside of said box for cleaning and service;

h) second mounting means inside of said box and separate from first means, for moving said second air moving means from a normal operative position inside said box to an alternative service position outside of said box for cleaning and service; and in which

i) said heat exchange element is physically dispensed in between said first mounting means and said second mounting means, removal of said heat exchange element enabling access to one of said first mounting means or said second mounting means.

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**5,035,282**

## HEAT EXCHANGER MADE OF ALUMINUM AND SURFACE TREATING METHOD THEREFOR

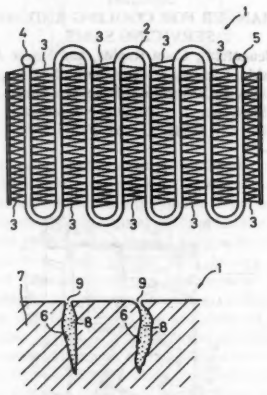
**Hiroichi Kawashita, and Yasunori Komatsu, both of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 6, 1989, Ser. No. 418,308**

**Claims priority, application Japan, Oct. 7, 1988, 63-251866**

**Int. Cl.[5] F28F *19/02***

**U.S. Cl. 165—133** **1 Claim**



**1.** A heat exchanger having fins and a tube at least one of which is made of aluminum or aluminum alloy, comprising:

an anodized surface layer having numerous pores therein and provided on at least a part of surfaces of said fins or said tube which is made of aluminum, said pores have open ends which are partially closed by sealing; and

fungicide filled in said pores of said anodized surface layer.

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**5,035,283**

## NESTED-TUBE HEAT EXCHANGER

**Peter Brücher, and Helmut Lachmann, both of Berlin, Fed. Rep. of Germany, assignors to Borsig GmbH, Berlin, Fed. Rep. of Germany**

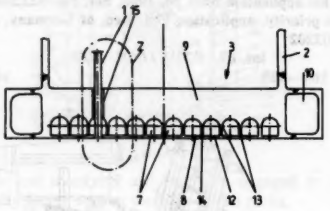
**Filed Dec. 6, 1989, Ser. No. 446,989**

**Claims priority, application Fed. Rep. of Germany, Sep. 9, 1989, 3930205**

**Int. Cl.[5] F28F *19/00, 9/02***

**U.S. Cl. 165—134.1** **9 Claims**

**1.** A nested-tube heat exchanger comprising: tube plates; a nest of tubes secured at each end in said tube plates for transferring heat between a hot gas flowing through said tubes and a liquid or vaporous coolant flowing around said tubes; a jacket surrounding said nest of tubes and secured to said tube plates; one tube plate having parallel cooling channels in a part of said tube plate facing away from said jacket, said cooling channels conducting coolant therethrough; said tube plate having bores opening into said jacket and communicating with said cooling channels, said bores being arranged concentrically around said tubes; a gas-intake end, said tube plate with said cooling channels being at said gas-intake end; said tubes extending through



said cooling channels; said cooling channels having a base of uniform thickness impinged by said gas; a coolant-intake chamber extending halfway around said heat exchanger and connected to an inner surface of said jacket as well as to an edge of said tube plate; each cooling channel being closed at each end and communicating with said coolant-intake chamber through an axial bore.

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**5,035,284**

## PLATE-FIN-TYPE HEAT EXCHANGER

**Junichi Oya, Sakai, and Shoichi Kashima, Osaka, both of Japan, assignors to Sumitomo Presicion Products Co. Ltd., Gyogo, Japan**

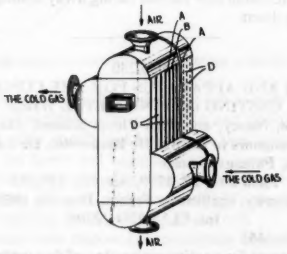
**PCT No. PCT/JP88/01291, § 371 Date Dec. 7, 1989, § 102(e) Date Dec. 7, 1989, PCT Pub. No. WO89/05951, PCT Pub. Date Jun. 29, 1989**

**PCT Filed Dec. 22, 1988, Ser. No. 445,665**

**Claims priority, application Japan, Dec. 24, 1987, 297156**

**Int. Cl.[5] F28F *13/00***

**U.S. Cl. 165—146** **4 Claims**



**1.** A plate-fin-type heat exchanger for transferring heat from a hot fluid to a cold fluid, said heat exchanger defining opposite first and second sides, opposite third and fourth sides and opposite first and second ends, said heat exchanger including a plurality of parallel plates which are stacked between said first and second sides and which includes fins that define alternate interdigitated first and second fluid passages, said fins defining said first fluid passages having a high coefficient of heat transfer and a large area of heat transfer, said first fluid passages being intended to continuously convey a first of said hot and cold fluids, and said fins defining said second fluid passages having a low coefficient of heat transfer and a small area of heat transfer, said second fluid passages being intended to intermittently convey a second of said hot and cold fluids.

5,035,285

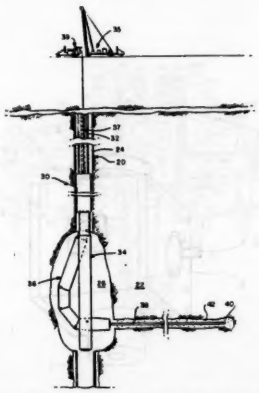
## GRAVEL PACKING SYSTEM FOR A PRODUCTION RADIAL TUBE

Ben W. O. Dickinson, San Francisco; Randall R. Anderson, Vallejo; Robert W. Dickinson; Eric W. Dickinson, both of San Rafael, and Herman Dykstra, Concord, all of Calif., assignors to Petrolphysics Operators, San Francisco, Calif.

Division of Ser. No. 373,146, Jun. 28, 1989, Pat. No. 4,974,672. This application Sep. 13, 1990, Ser. No. 582,438

Int. Cl.[5] E21B *43/00*

U.S. Cl. 166—65.1 4 Claims



1. A method of forming spaced perforations in an electrically conductive production radial tube extending from a well bore in an underground formation, said method comprising

(a) passing an elongate hollow perforating tool, having a forward end and a rearward end and defining a lumen, through the electrically conductive production radial tube having a distal end and a proximal end to be perforated until the forward end of said perforating tool is adjacent the distal end of said radial tube, said perforating tool comprising an elongate hollow perforating pipe with port means defining spaced ports with electrically conductive perimeters connected to an electrical power source through said radial tube,

(b) passing an electrolyte solution through the lumen of said perforating tool and out said ports to be directed against adjacent regions of said electrically conductive radial tube while current is supplied to said port perimeters to form spaced perforations at said adjacent regions, and

(c) withdrawing said perforating tool.

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5,035,286

## METHODS AND APPARATUS FOR FIELD BLASTING OF EARTH FORMATIONS USING INFLATABLE DEVICES FOR SUSPENDING EXPLOSIVES IN BOREHOLES

Daniel F. Fitzgibbon, Jr., Rte. 3, Van Dyke Mill Rd., Taylorsville, Ky. 40071

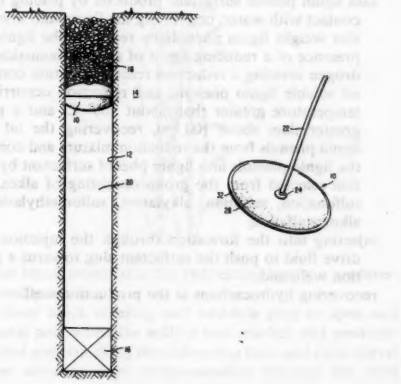
Continuation of Ser. No. 166,542, Mar. 10, 1988, Pat. No. 4,919,203. This application Feb. 16, 1990, Ser. No. 480,909

Int. Cl.[5] E21B *33/127*

U.S. Cl. 166—187 37 Claims

1. An inflatable device for supporting a mass of stemming material or explosive material within an uncased borehole formed vertically or essentially vertically in the earth prior to initiation of blasting within the borehole, walls of the borehole being irregular due to drilling of the borehole into the earth, comprising:

body means comprising flexible portions of the inflatable device for extending into contact with walls of the borehole and for transferring pressure from an inflating fluid introduced into the inflatable device to the irregular walls of the borehole, the pressure being adequate to provide an essentially vertical force component directed against the stemming material or explosive material supporting said material at a desired location within the borehole, the inflatable device being capable of inflation within the borehole; and,



means carried by the inflatable device for connection to a source of inflating fluid and through which the inflatable device is filled with said fluid to expand the flexible portions into engagement with the irregular walls of the borehole.

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5,035,287

## REDOX GEL PROCESS FOR MORE UNIFORM FLUID FLOW IN FORMATIONS

John L. Cayias; Susan M. Holley, both of Richardson, and Gunter J. Lichtenberger, Dallas, all of Tex., assignors to Oryx Energy Company, Dallas, Tex.

Filed Jul. 30, 1990, Ser. No. 559,612

Int. Cl.[5] E21B *33/138, 43/22, 49/00*

U.S. Cl. 166—250 18 Claims

1. A method for obtaining a more uniform flow of fluids in a subterranean reservoir in fluid communication with one or more wellbores comprising:

(a) injecting into the reservoir an aqueous solution of oxidizing compound containing a metal at a valence state greater than +3 that can be reduced to a valence state of +3 in an oxidation-reduction chemical reaction;

(b) permitting the solution to remain in contact with the reservoir for a time sufficient to allow the oxidizing compound partly to undergo a chemical reduction reaction with the reservoir; and

(c) thereafter injecting into the reservoir an aqueous solution of a water-soluble polymer which is capable of being cross-linked by the metal to increase the resistance to fluid flow.

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5,035,288

## LIGNIN PHENOL/LIGNIN/AMINE SURFACTANT SYSTEM

Dan E. Kieke, and Douglas G. Naae, both of Houston, Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Jun. 18, 1990, Ser. No. 539,506

Int. Cl.[5] E21B *43/22*

U.S. Cl. 166—274 16 Claims

1. A method of recovering hydrocarbons from an underground hydrocarbon formation penetrated by at least one

injection well and at least one production well, which comprises:

injecting into the formation through an injection well about 0.05 to about 1.0 pore volumes of an aqueous surfactant slug comprising about 0.1% to about 10% by weight surfactant system;

said surfactant system comprised of a lignin phenol surfactant, a lignin, a primary amine having about 8 to about 20 carbon atoms, and a solubilizer,

said lignin phenol surfactant produced by placing lignin in contact with water, converting the lignin into low molecular weight lignin phenols by reducing the lignin in the presence of a reducing agent of carbon monoxide or hydrogen creating a reduction reaction mixture comprising oil soluble lignin phenols, said reduction occurring at a temperature greater than about 200° C. and a pressure greater than about 100 psi, recovering the oil soluble lignin phenols from the reduction mixture and converting the lignin phenols into lignin phenol surfactant by a reaction selected from the group consisting of alkoxylation, sulfonation, sulfation, alkylation, sulfomethylation, and alkoxysulfation;

injecting into the formation through the injection well a drive fluid to push the surfactant slug towards a production well; and

recovering hydrocarbons at the production well.

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**5,035,289**

**Patent Not Issued For This Number**

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**5,035,290**

## HEIGHT SENSING DEVICE INCLUDING AN ULTRASONIC SENSOR AND A MECHANICAL SENSOR

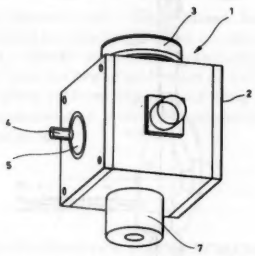
**Paul Harms, and Willibald Sehr, both of Hadamar-Steinbach, Fed. Rep. of Germany, assignors to MOBA-Electronic Gesellschaft fur Mobil-Automation mbh, Elz, Fed. Rep. of Germany**

**Filed Oct. 27, 1989, Ser. No. 428,218**

**Int. Cl.[5] E02F *3/84***

**U.S. Cl. 172—1** **2 Claims**

1. A method for grading a plurality of surfaces utilizing a motor grader that can be operated to create a graded surface relative to a chosen height reference, the motor grader including a blade for contacting the ground, a switch in a driver's cab, said switch having first and second positions, a height sensing device for determining the height of the blade relative to the height reference, the height sensing device including a mechanical height-position sensor for determining mechanically the height of the blade relative to an initial height reference provided by a tight rope and generating a first electrical height signal, the height sensing device further including an ultrasonic height-position sensor providing ultrasonic signals which are used for determining the height of the blade relative to a graded surface extending on the ground, at which the ultrasonic sensor is aimed, and generating a second electric height signal corresponding to the determined height, a control circuit responsive to the first and second positions of the switch for respectively selecting either the first or second electric height signal as a height sensing device output, the motor grader further including electrically hydraulic valves




responsive to the height sensing device output for raising and lowering the blade, said method comprising the steps of:

extending a tight rope defining an initial height reference,

setting the switch to the first position,

operating the motor grader using the first electrical height signal at the height sensing device output to control the blade height relative to the tight rope, thereby creating a first graded surface,

setting the switch to the second position, and

aiming the ultrasonic signals at the first graded surface and operating the motor grader using the second electrical height signal as the height sensing device output to control the blade heights relative to the first graded surface, thereby creating a second graded surface.

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**5,035,291**

## SEAFLOOR DRILLING APPARATUS

**Roger G. Shields, Dewinton, Canada, assignor to Amoco Corporation, Chicago, Ill.**

**Filed Jul. 6, 1990, Ser. No. 548,786**

**Int. Cl.[5] E21B *7/12, 7/124***

**U.S. Cl. 175—5** **11 Claims**

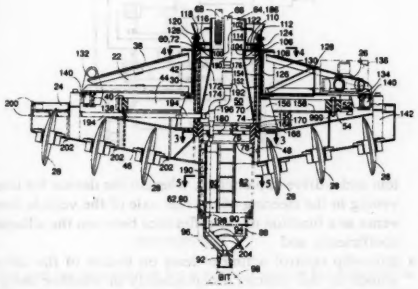
1. A seafloor drilling apparatus for drilling a hole in the seafloor, comprising:

an upper body having an upper side, a lower side, and an opening extending vertically through the upper body from the upper side to the lower side;

a lower body, rotatably connected to the upper body, having an upper side, a lower side, and an opening extending vertically through the lower body from the upper side to the lower side in such a manner that the upper body and the lower body when connected each have the vertically extending openings aligned defining a continuous passageway through the upper and lower bodies

rotator means for rotating the lower body relative to the upper body;

cutting means, connected to the lower body, for cutting seafloor material and moving the cuttings toward the lower body opening;



a casing, extending through the continuous passageway and having an upper end adjacent the upper side of the upper body and a lower end adjacent the lower side of the lower body, for receiving the cuttings from the cutting means and carrying the cuttings through the continuous passageway; a riser connector having an upper end and a lower end, the lower end being connected to the upper body so as to block the casing in the passageway; and

engagement means for limiting downward travel of the casing in the passageway so that the casing is securable in a preselected position of downward travel and is removable from the passageway through the upper side of the upper body, and for engaging the casing with the lower body so that the casing is rotated with the lower body.

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**5,035,292**

**WHIPSTOCK STARTER MILL WITH PRESSURE DROP TATTLETALE**

**Thomas F. Bailey; John E. Campbell, both of Houston, and Edmond Kagler, Jr., Sugarland, all of Tex., assignors to MASX Energy Service Group, Inc., Houston, Tex.**

**Filed Jan. 11, 1989, Ser. No. 296,249**

**Int. Cl.[5] E21B *47/02***

**U.S. Cl. 175—45** **22 Claims**

**11.** In an apparatus for changing the direction of drilling through a well casing, the apparatus including a redirecting tool having a redirecting face and a milling tool having a longitudinal fluid passageway, a tattletale assembly for determining the position of the milling tool along the redirecting face, said tattletale assembly comprising:

a tattletale plug replaceably mounted within a lateral port formed in a peripheral wall of the milling tool, said port providing fluid communication between the fluid passageway and the interior of the well casing, said plug preventing fluid communication between the passageway and the casing interior; and

a shear block mounted to the redirecting face at a predetermined position;

said shear block shearing said tattletale plug to open said lateral port when the milling tool reaches said predetermined position along the redirecting face, said open lateral port allowing fluid communication between the fluid passageway and the casing interior thereby creating a fluid pressure drop within the fluid passageway.

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**5,035,293**

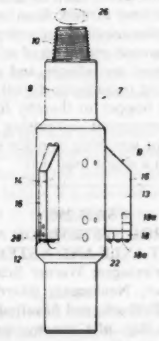
**BLADE OR MEMBER TO DRILL OR ENLARGE A BORE IN THE EARTH AND METHOD OF FORMING**

**Allen K. Rives, 12211 Carols Way Cir., Houston, Tex. 77070**

**Filed Sep. 12, 1990, Ser. No. 581,557**

**Int. Cl.[5] E21B *10/46***

**U.S. Cl. 175—57** **14 Claims**



**1.** A blade for mounting on a member to be supported on a rotatable well string to position the blade in operating position to drill or enlarge a well bore in the earth upon rotation of the well string and member, said blade including:

a blade body;

said blade body having a bottom surface with leading and trailing edges for projecting outwardly of said member when in operating position;

said blade having a side surface with leading and trailing edges for extending generally longitudinally and in spaced relation to the member when in operating position;

cutting elements on said blade along said bottom leading edge and at least partially along said side leading edge,

said cutting elements terminating in substantially the same plane as said blade bottom and side surfaces; and

shock absorbers on said blade bottom surface, said shock absorbers being spaced relative to their longitudinal centerline axis to form a non-continuous surface which projects below said cutting elements and below said blade bottom surface to engage the earth ahead of the cutting elements to form annular recess in the earth contacted.

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**5,035,294**

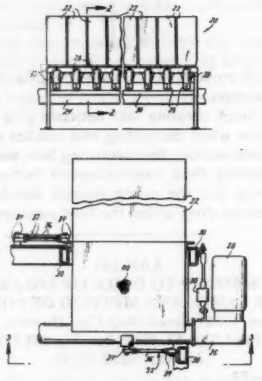
**IN PLACE BIN WEIGHING DEVICE FOR BATCH WEIGHER**

**Joseph A. Volk, Jr., Creve Coeur, Mo., assignor to Beta Raven Inc., Earth City, Mo.**

**Filed Jan. 30, 1990, Ser. No. 472,592**

**Int. Cl.[5] G01G** *19/22, 21/24*

**U.S. Cl. 177—70** **20 Claims**



1. In a device having a framework, a plurality of bins supported from said framework, each of said bins having means for holding an ingredient in bulk form in a quantity significantly greater than that required for a single batch thereof to thereby permit continuous operation of said device to prepare multiple batches of said ingredients, and means for feeding a desired amount of said ingredients directly from each of said bins into a common hopper to thereby form a batch of said ingredients, the improvement comprising at least one of said bins having means for weighing in place said at least one bin and its contents with a single load cell.

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**5,035,295**

**STEERING CONTROL SYSTEM FOR A VEHICLE WITH A STEERED FRONT AXLE AND A STEERED REAR AXLE**

**Heinz Leiber, Oberriexingen; Werner Schneider, Winnenden; Erich Waxenberger, Neuhausen; Martin Klarer, Kernen; Richard Zimmer, Fellbach, and Manfred Burckhardt, Waiblingen, all of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Fed. Rep. of Germany**

**Filed May 21, 1990, Ser. No. 525,679**

**Claims priority, application Fed. Rep. of Germany, May 19, 1989, 3916354**

**Int. Cl.[5] B62D** *7/15, 5/06*

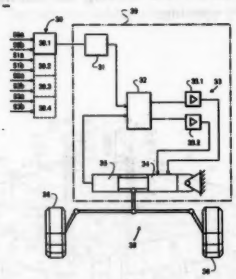
**U.S. Cl. 180—140** **14 Claims**

1. Steering control system for a four-wheel vehicle with a steered front axle and a steered rear axle, comprising

an anti-lock system operatively arranged to act on all four wheels;

a device for intervening in steering of the rear axle such that, during a braking operation in which a different braking effect occurs on the left and on the right side of the vehicle, steering lock of the rear axle counteracts a yawing moment which arises, and the rear wheels are deflected in the direction of the vehicle side on which a higher braking effect occurs;

means for detecting different adhesion coefficients of at least two wheels of different sides of the vehicle, the difference between the adhesion coefficients being detected from a difference between different occurring brake pressures of at least two wheels of different sides of the vehicle in response to the control signals of one of an anti-lock sys-



tem and a drive-slip control, wherein the device for intervening in the steering of the rear axle of the vehicle intervenes as a function of the difference between the adhesion coefficients; and

a drive-slip control acting at least on brakes of the driven wheels of the vehicle, independently of whether there is an anti-lock system signal or a drive-slip control signal, wherein the device causes a deflection of the rear wheels in the direction of the vehicle side on which the higher braking torque is generated.

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**5,035,296**

**VEHICLE ENGINE SUSPENSION DEVICE**

**Göran Sjöstrand, Goteburg, Sweden, assignor to AB Volvo, Gothenburg, Sweden**

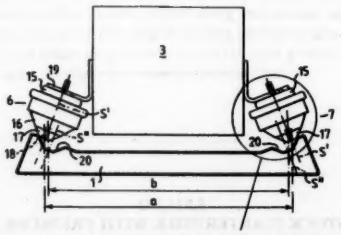
**PCT No. PCT/SE88/00657, § 371 Date May 30, 1990, § 102(e) Date May 30, 1990, PCT Pub. No. WO89/05245, PCT Pub. Date Jun. 15, 1989**

**PCT Filed Dec. 1, 1988, Ser. No. 476,387**

**Claims priority, application Sweden, Dec. 3, 1987, 8704847**

**Int. Cl.[5] F16F** *15/08*

**U.S. Cl. 180—297** **4 Claims**



1. In a vehicle engine suspension arrangement comprising at least one pair of compressible engine cushions (6, 7) which are connected to the engine (3) and which include supports (17) for attachment against seats (20) located on an engine bed (1), the cushions and seats having axes of symmetry that are inclined upward and inward toward one another; each cushion being compressible in the direction of its axis of symmetry; the improvement wherein the distance (a) between the axes of symmetry at the supports (17) in the unloaded expanded condition of the cushions (6, 7) is greater than the distance (b) between the axes of symmetry at the seats (20), the compressibil-

ity of the cushions (6, 7) being adapted to the weight of the engine so that, when the cushions are subjected to the static weight of the engine, said axes of symmetry coincide and the cushions are essentially free from shear forces.

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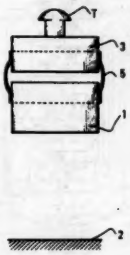
5,035,297

## ANTI-BOUNCE DEVICE FOR A MASS STRIKING A TARGET ELEMENT

Patrick Meynier, Chatou, France, assignor to Institut Francais du Petrole, Rueil Malmaison, France

Filed Apr. 20, 1990, Ser. No. 511,766
Claims priority, application France, Apr. 20, 1989, 89 05386
Int. Cl.[5] G01V 1/40
U.S. Cl. 181—106 7 Claims



1. An anti-bounce device for a seismic source for generation seismic pulses in a bore hole by impacting a target element in contact with the earth by a mass dropping from a first position, the anti-bounce device comprising a counter-mass for preventing a bouncing of the mass means for loosely holding and integrally connecting the counter-mass at a predetermined distance from said mass and behind the same as viewed in a dropping direction, and braking means for delaying the movement of the counter mass with respect to the mass after impact thereby putting the mass and counter mass in phase opposition, whereby secondary impacts of the mass on said target element are suppressed.

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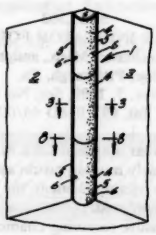
5,035,298

## WALL ATTACHED SOUND ABSORPTIVE STRUCTURE

Arthur M. Noxon, 437 Lawrence St., Eugene, Oreg. 97401

Filed Apr. 2, 1990, Ser. No. 502,781
Int. Cl.[5] E04B 1/82
U.S. Cl. 181—295 15 Claims



1. A sound absorptive structure for installation on a room wall structure, said sound absorptive structure comprising,

an elongate body of sound absorptive material of curvlinear section and having side edges and terminating at opposite ends,

retention means for attachment to this room wall structure and including surfaces to receive and retain said side edges of said body proximate the room wall structure, and

closure means in place on the opposite ends of said elongate body.

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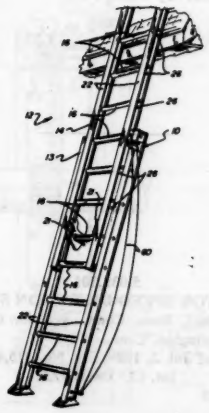
5,035,299

## METHOD AND DEVICE FOR EXTENSION LADDER SAFETY

Martin A. Eisenberg, 3577 NW. 16th Blvd., Gainesville, Fla. 32605

Filed Aug. 1, 1990, Ser. No. 561,149
Int. Cl.[5] E06C 7/06
U.S. Cl. 182—212 13 Claims



1. A device for preventing unintentional lowering of a fly section of an extension ladder with respect to a base section of the ladder, each section of the ladder having two rails and a plurality of rungs, one rail of one of the ladder sections having at least one insertion hole formed therein extending from one side of the rail to the other, comprising:

a. insertion pin shaped to fit into the insertion hole formed in a rail of a ladder section, said insertion hole extending from one side of the rail to the other, and

b. attachment means for attaching the insertion pin to a rail of the section of the ladder other than the section having the insertion hole,

wherein, the insertion pin and attachment means are aligned with respect to the insertion hole so that the insertion pin can be inserted through the insertion hole only when the fly section of the ladder is positioned with respect to the base section so as to permit the fly section to be held in place with respect to the base section.

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5,035,300

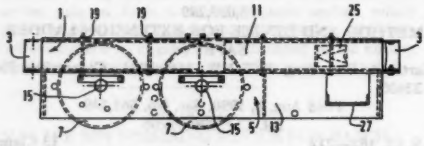
## SUPPORT BEAM FOR ELEVATOR SHEAVES

Jean-Claude Chapelain, Sainte-Genevieve-des-Bois, and Daniel Beaulieu, Saint-Brisson/Loire, both of France, assignors to Otis Elevator Company, Farmington, Conn.

Filed Dec. 1, 1989, Ser. No. 444,475
Claims priority, application France, Dec. 1, 1988, 88 15753
Int. Cl.[5] B66B 9/16
U.S. Cl. 187—1 R 8 Claims

1. A support beam for elevator sheaves to be mounted in a hoistway of a predetermined width having recesses defined by the hoistway walls which comprises: a load carrying beam having at least one telescopic arm (3) mounted at an end of the beam, said arm having a first retracted position when the length of the beam is less than the predetermined hoistway width for facilitating positioning of the beam in the shaft and a

second extended position in which the arm is extended to engage a corresponding hoistway recess (18) provided for



receiving the arm and the length of the beam is greater than the predetermined hoistway width.

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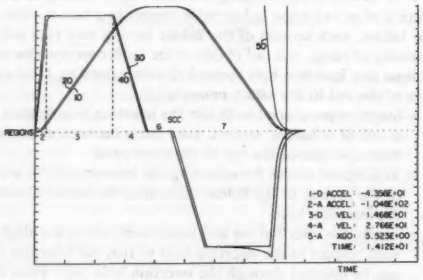
5,035,301

## ELEVATOR SPEED DICTATION SYSTEM

Clement A. Skalski, Avon, Conn., assignor to Otis Elevator Company, Farmington, Conn.

Filed Jul. 3, 1989, Ser. No. 375,429
Int. Cl.[5] B66B 1/30
U.S. Cl. 187—118 11 Claims




1. In an elevator speed dictation system for controlling acceleration and deceleration of an elevator, a method of building a table of data during the acceleration of the elevator for use during the deceleration of the elevator, said method comprising the steps of:

integrating a predetermined jerk rate over a plurality of time values to obtain a plurality of dictated acceleration values;

integrating said plurality of dictated acceleration values over the plurality of time values to obtain a plurality of dictated velocity values, said dictated velocity values for use by the speed dictation system for controlling the velocity of the elevator;

determining, for each of said dictated velocity values, a table velocity value based on said dictated velocity value;

determining, for each of said dictated velocity values, a table position value and a table acceleration value based on said dictated velocity value; and

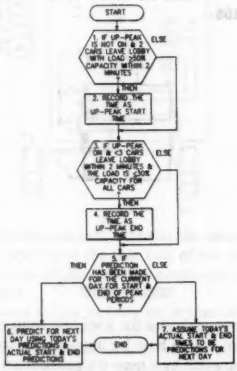
storing said table velocity values and said table acceleration values as a function of said table position values for use by the speed dictation system for controlling the deceleration of the elevator.

5,035,302

## "ARTIFICIAL INTELLIGENCE" BASED LEARNING SYSTEM PREDICTING "PEAK-PERIOD" TIMES FOR ELEVATOR DISPATCHING

Kandasamy Thangavelu, Avon, Conn., assignor to Otis Elevator Company, Farmington, Conn.

Continuation-in-part of Ser. No. 318,295, Mar. 3, 1989, Pat. No. 5,022,497, which is a continuation-in-part of Ser. No. 209,744, Jun. 21, 1988, Pat. No. 4,838,384. This application Mar. 2, 1990, Ser. No. 487,574
Int. Cl.[5] B66B 1/20
U.S. Cl. 187—125 64 Claims


START
1. IF UP-PEAK IS NOT ON & 2 CARS LEAVE LOBBY WITH LOAD ≥50% CAPACITY WITHIN 2 MINUTES
ELSE
THEN
2. RECORD THE TIME AS UP-PEAK START TIME
3. IF UP-PEAK OR & ≥3 CARS LEAVE LOBBY WITHIN 2 MINUTES & THE LOAD IS ≤50% CAPACITY FOR ALL CARS
ELSE
THEN
4. RECORD THE TIME AS UP-PEAK END TIME
5. IF PREDICTION HAS BEEN MADE FOR THE CURRENT DAY FOR START & END OF PEAK PERIODS
THEN
ELSE
6. PREDICT FOR NEXT DAY USING TODAY'S PREDICTIONS & ACTUAL START & END PREDICTIONS
END
7. ASSUME TODAY'S ACTUAL START & END TIMES TO BE PREDICTIONS FOR NEXT DAY

1. In an elevator dispatching system controlling the assignment of elevator cars from a lobby level to various floors in a building having a predetermined population, a method of determining the commencement of an UP-PEAK period of operation, said method comprising the steps of:

obtaining historical information of the number of passengers boarding the elevators at the lobby during a plurality of predetermined time intervals, said time intervals being within a predetermined time period;

predicting a lobby boarding count for a specific predetermined time interval based on said historical information;

comparing said predicted lobby boarding count with a predetermined percentage of the building's population; and

commencing UP-PEAK operation at the beginning of said specific time interval if said predicted lobby boarding count is greater than said predetermined percentage of the building's population.

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5,035,303

## EXCESSIVE WEAR INDICATOR FOR BRAKE SYSTEM

James L. Sullivan, Rochester, Mich., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Filed Nov. 7, 1989, Ser. No. 432,817
Int. Cl.[5] F16D 66/00
U.S. Cl. 188—1.11 6 Claims

1. An excessive wear indicator for a brake system including a fluid actuated linearly moving piston associated with at least one moveable brake friction element, the piston disposed in an opening in a housing, said piston and opening defining an expansible fluid pressure receiving chamber in communication with a brake fluid supply;

said housing including a stop surface at one end of the opening, said piston being movable between a normal at-rest position at which a surface portion of said piston engages said stop surface and a brake actuating position in which the surface portion of said piston is axially spaced from said stop surface;

a bore in the housing extending transversely with respect to the direction of movement of said piston and being aligned

with a piston wall portion, said piston wall portion being located remote from said at least one movable brake friction element at least when said piston is in said normal at-rest position;

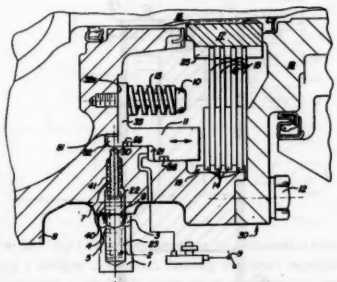
a plunger pin means slidably disposed in said bore;

said plunger pin means including a distal feeler end and a proximal actuator end;

spring means for biasing the distal end of the plunger pin means in a direction away from the piston wall portion;

stop means for limiting movement of the plunger pin means away from the piston wall portion;

said plunger pin means disposed so that, when stopped by said stop means, the distal end is adjacent the piston wall portion and the proximal end is outside said housing;



said feeler end of said plunger pin means being disposed adjacent said piston wall portion at least when the piston is in its brake actuating position for so long as excessive piston travel associated with excessive brake wear is absent, said piston wall portion being disposed out of the path of sliding motion of the feeler end of said plunger pin means when the piston travel exceeds a distance associated with excessive brake wear, whereby manipulation of said plunger pin means from outside the housing by moving same against the bias of the spring means provides an indication of piston travel and excessive brake wear by said feeler end cooperating with said piston wall portion to sense excessive piston travel associated with excessive brake wear.

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**5,035,304**

## DISK BRAKE FOR VEHICLE WHEEL

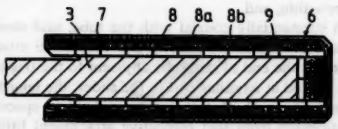
**Karl Bösch, Hutzmannweg 14, 4202 Duggingen, Switzerland, assignor to Karl Bösch and André Bösch**

**Filed Oct. 23, 1989, Ser. No. 425,809**

**Claims priority, application Switzerland, Oct. 25, 1988, 3975/88**

**Int. Cl.[5] F16D 55/22**

**U.S. Cl. 188—71.1** **7 Claims**




1. Disc brake for vehicle wheel comprising a brake disc, brake shoes, and a brake shoe bracket in which the brake shoes are supported, wherein at least one container adapted to accumulate and store dust abraded from the brake shoes and brake disc is provided, the container including a housing which embraces a section of the brake disc and a filter disposed between the housing and the sections of both brake disc surfaces overlapped by the housing, the filter being adapted to take up the abraded dust, the container being disposed adjacent to and with no interspace from a side of the brake shoe bracket at which, in the forward travelling vehicle, the brake disc leaves the region of the brake shoes.

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**5,035,305**

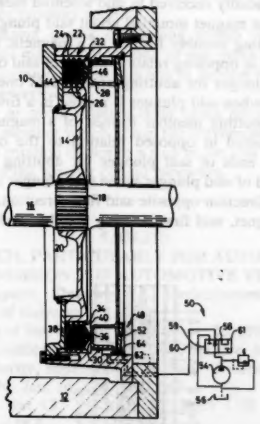
## CUSHIONED BRAKE ASSEMBLY

**Bryan G. Lammers, Washington, Ill., assignor to Caterpillar Inc., Peoria, Ill.**

**Filed Oct. 2, 1989, Ser. No. 415,678**

**Int. Cl.[5] F16D 55/36**

**U.S. Cl. 188—71.5** **12 Claims**



1. A cushioned power transfer assembly comprising:

a stationary housing;

a rotatable hub;

a rotatable power shaft splined to said hub;

a plurality of first friction discs splined to said housing;

a plurality of second friction discs splined to said hub, each of said second friction discs being adjacent at least one of said first friction discs;

a powered piston having a planar contact surface and being positioned within and moveable relative to said housing;

a floating cushion disc, said cushion disc having a rigid plate portion and a resilient portion, said cushion disc being positioned between said piston and said friction discs; and

power means for moving said piston into contact with said resilient portion and away from said resilient portion.

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**5,035,306**

## ADJUSTABLE DAMPING FORCE HYDRAULIC SHOCK ABSORBER

**Masahiro Ashiba, Kanagawa, Japan, assignor to Tokico Ltd., Kanagawa, Japan**

**Filed Dec. 14, 1989, Ser. No. 450,919**

**Claims priority, application Japan, Dec. 14, 1988, 63-315921**

**Int. Cl.[5] F16F 9/34**

**U.S. Cl. 188—299** **8 Claims**

1. An adjustable damping force hydraulic shock absorber comprising:

a cylinder;

a piston fitted in said cylinder for axial movement and partitioning the interior of said cylinder into two chambers;

a plurality of passages through which working fluid contained in said cylinder is adapted to flow when said piston moves axially in said cylinder;

at least one damping force generating mechanism for generating a damping force by controlling the flow of the working fluid through said passages; and

a damping force regulating valve mechanism for regulating

the damping force by opening or closing one specific passage of said plurality of passages;

said damping force regulating valve mechanism including:

an axially movable valve element movable between a first position in which it is seated on a valve seat formed in said specific passage and closes said specific passage, and a second position in which it is separated from said valve seat and opens said specific passage;

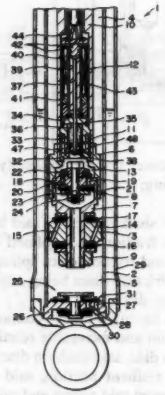
a plunger formed of a magnetic material and having opposite ends;

a solenoid means for selectively moving said plunger in opposite directions when energized, said plunger being axially slidably received in said solenoid means;

a permanent magnet mounted about said plunger,

a first abutting member formed of a magnetic material and mounted in opposing relation to one of said opposite ends of said plunger for abutting against said one end of said plunger when said plunger is moved in a first direction;

a second abutting member formed of a magnetic material and mounted in opposed relation to the other of said opposite ends of said plunger for abutting against said other end of said plunger when said plunger is moved in a second direction opposite said first direction, said permanent magnet, said first abutting member and said second



abutting member forming a closed magnetic loop for holding said plunger in abutting relation with said first abutting member after said plunger has been moved into abutting relation with said first abutting member due to a first type of activation of said solenoid means, and for holding said plunger in abutting relation with said second abutting member after it has been moved into abutting relation with said second abutting member due to a second type of activation of said solenoid means;

a shaft connected at one end thereof to one of said opposite ends of said plunger, said valve element being slidably mounted on the other end of said shaft;

a retaining means, mounted on said other end of said shaft, for retaining said valve element in fixed relation with respect to said shaft and causing said valve element to separate from said valve seat when said plunger is moved in said first direction and abuts against said first abutting member, and for allowing said valve element to slide along said shaft when said plunger is moved in said second direction and said valve element becomes seated on said valve seat so as to allow said plunger to move into abutting relation with said second abutting member; and

a biasing means for biasing said valve element toward said valve seat.

**5,035,307**

## ENERGY ABSORBING DEVICE

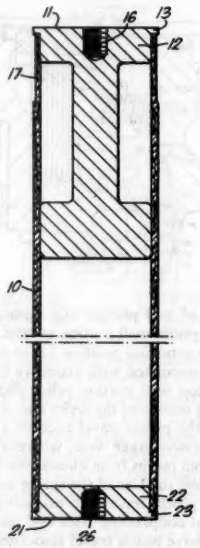
**Majid M. Sadeghi, Newport Pagnell, and Vivian M. Stephens, Neaton, both of Great Britain, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britian and Northern Ireland, London, England**

**Filed Oct. 16, 1989, Ser. No. 421,593**

**Claims priority, application United Kingdom, Feb. 22, 1989, 8903994**

**Int. Cl.[5] F16F 7/52**

**U.S. Cl. 188—372** **7 Claims**



1. A lightweight energy absorber reactive to sudden compressive overload and subsequent rebound forces, comprising:

a collapsible composite tube comprising a matrix of plastics material reinforced with long fibers in which the reinforcement comprises tough fibers;

a trigger zone adjacent one end of said tube which comprises a localized circumferential band of weakening in the tube wall which concentrates stresses relative to the other parts of the tube wall;

a pair of attachment fittings, each one affixed to a respective end of said tube;

a slider located within the said tube and being a sliding fit therewithin, and

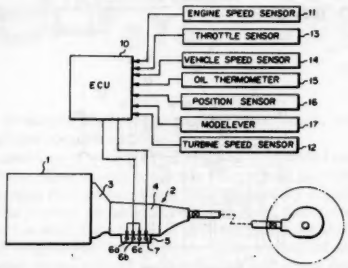
a stem substantially coaxial with the tube, said stem being affixed at one of its ends to the respective attachment fitting at the end of said tube adjacent to the trigger zone and affixed at its other end to the slider, the length of the stem being such that the slider is held in spaced-apart relationship from said respective attachment fitting at a position beyond the trigger zone,

whereby longitudinal collapse of the tube commences at the trigger zone through the attachment fittings on application of a compressive load in excess of a predetermined compressive threshold and propagates beyond said trigger zone by a local wall buckling mode on continuance of said excess compressive load, and whereby axial alignment of the tube is maintained during collapse thereof by cooperation between the slider and the uncollapsed portion of the tube.

## 5,035,308
## LOCK-UP CONTROL SYSTEM FOR AUTOMATIC TRANSMISSION

**Fumiaki Baba, Higashihiroshima; Masanori Izumi, Hatsukaichi; Kenji Sawa, and Susumu Kurumida, both of Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan**

**Filed Sep. 29, 1988, Ser. No. 250,603**
**Claims priority, application Japan, Oct. 1, 1987, 62-249336; Feb. 8, 1988, 63-27236**
**Int. Cl.[5] B60K *41/28*; F16H *45/02***
**U.S. Cl. 192—0.052** **14 Claims**




1. In a lock-up control system for an automatic transmission including a torque converter having an input member and an output member, a multiple stage gear transmission mechanism connected with the output member of the torque converter and having a plurality of gear stages, and a lock-up clutch for connecting the input member and the output member bypassing the torque converter wherein an engaging force in the lock-up clutch is controllable so as to change the amount of torque transmitted through the lock-up clutch, the improvement comprising:

shift detecting means for detecting a shift operation in the transmission mechanism, and

control means for maintaining the engaging force at a predetermined value smaller than a fully engaged condition of the lock-up clutch and larger than an entirely released condition of the lock-up clutch throughout the shift operation.

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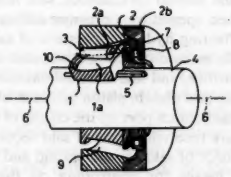
## 5,035,309
## ROLLING-CONTACT BEARING TYPE CLUTCH

**Nobuo Takada, 965-17, Kurotani, Yao-shi, Osaka, Japan**

**Filed Apr. 16, 1990, Ser. No. 509,668**
**Claims priority, application Japan, May 8, 1989, 1-113621; Dec. 20, 1989, 1-328418**
**Int. Cl.[5] F16D *23/00, 41/06, 43/14***
**U.S. Cl. 192—45** **9 Claims**



1. A rolling-contact bearing type clutch comprising an inner rotation body, an outer rotation body, a plurality of intermediate rotation bodies and energizing means;

said inner rotation body defining an inner raceway surface in the shape of a mono-hyperboloid of revolution about one axis line;

said outer rotation body defining an outer raceway surface in the shape of a mono-hyperboloid of revolution about said axis line;

said inner raceway surface and said outer raceway surface facing each other to form a combination of raceways;

said intermediate rotation bodies having cylindrical rolling surfaces and being disposed in the circumferential direction of said raceways with their center axes slanting at a predetermined angle to a section including said axis of said inner and outer rotation bodies, the surface of each intermediate rotation body being in line contact with said inner and outer raceway surfaces,

said energizing means comprising means for energizing either said inner rotation body or said outer rotation body in the direction of said axis line to narrow the spacing of said raceways; and

said inner or outer rotation body being provided with an annular member which brings the movement of said intermediate rotation bodies to a stop in the axis line direction to widen the spacing of said raceways.

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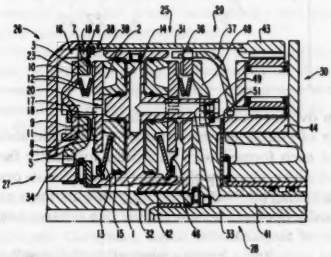
## 5,035,310
## CLUTCH, PARTICULARLY FOR AUTOMATIC TRANSMISSION FOR AUTOMOTIVE VEHICLES

**Michael Meyerle, Kiefernweg 9, Meckenbeuren-Lochbrucke, Fed. Rep. of Germany**

**Continuation of Ser. No. 07/192,511, Apr. 26, 1988, abandoned. This application Nov. 13, 1989, Ser. No. 436,094**
**Claims priority, application Fed. Rep. of Germany, Jul. 23, 1986, 3624894; Jan. 14, 1987, 3700813**
**Int. Cl.[5] F16D *25/061*; B60T *1/00***
**U.S. Cl. 192—48.5** **9 Claims**



1. A clutch mechanism comprising:

an elongated shaft mounted for rotation about its longitudinal axis;

a clutch carrier mounted on said shaft for rotation therewith in a fixed axial position;

first and second clutch assemblies, each including a movable ring and a mating ring, the rings of each assembly having facing interengageable clutch surfaces, the facing interengageable clutch surfaces of at least one of said assemblies comprising clutch profiles which are configured to assist in moving the rings apart under load,

said movable rings being mounted on said carrier for movement along respective axial paths with their respective clutch surfaces facing in the same axial direction,

said mating rings being respectively positioned on said paths with their respective clutch surfaces facing in the opposite axial direction; and

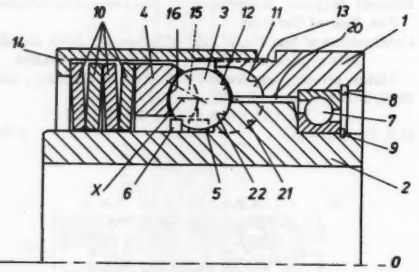
means carried by said carrier, comprising a respective fluid actuator piston element for each movable ring, for moving said movable rings independently toward their respective mating rings.

5,035,311

## OVERLOAD CLUTCH

Sobhy L. Girguis, Magdalenenstrasse 19, 5210 Troisdorf 14, Fed. Rep. of Germany

Division of Ser. No. 93,465, Sep. 4, 1987, Pat. No. 4,896,755.
This application Oct. 19, 1989, Ser. No. 424,056
Claims priority, application Fed. Rep. of Germany, Sep. 5, 1986, 8623878[U]
The portion of the term of this patent subsequent to Jan. 30, 2007, has been disclaimed.
Int. Cl.[5] F16D *7/08, 43/206*
U.S. Cl. 192—56 R 10 Claims




5. An overload clutch comprising:

a pair of clutch members relatively rotatable about an axis and each formed with an axially forwardly facing track and with a plurality of angularly spaced seats opening into the track, the seats being alignable to form axially forwardly open pockets in at least one relative angular position of the members;

means including a bearing supporting the members relative to each other for relative rotation about the clutch axis;

respective angularly spaced rolling elements engageable in the pockets and angularly displaceable in the tracks, whereby when the rolling elements are in the pockets the two members are rotationally coupled such that one can drive the other and when the rolling elements are in at least one track the members are relatively rotatable;

a ring member engaging the rolling elements;

means including a spring for pressing the ring member backward relative to the clutch members against the rolling elements and thereby urging the rolling elements into the pockets, the flank angle of the seats being such that the rolling elements in the pockets are pressed forward against the ring member with a force component largely dependent on torque transmitted between the two clutch members;

cage means formed by said ring member for holding the rolling elements at their angularly spaced positions; and

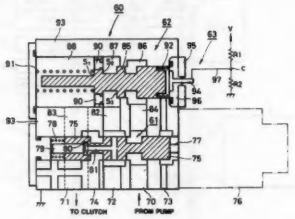
wherein said rolling elements are balls and said ring member providing said cage means is formed with axially open seats receiving and confining said balls.

5,035,312

## APPARATUS FOR CONTROLLING HYDRAULIC PRESSURE FOR CLUTCH

Yoshio Asayama; Makio Tsubota; Yasunori Okura, and Takayuki Sato, all of Kanagawa, Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

PCT No. PCT/JP87/00929, § 371 Date Nov. 22, 1988, § 102(e) Date Nov. 22, 1988, PCT Pub. No. WO88/07636, PCT Pub. Date Oct. 6, 1988
PCT Filed Nov. 30, 1987, Ser. No. 299,923
Claims priority, application Japan, Mar. 25, 1987, 62-70990; Mar. 25, 1987, 62-70991; Mar. 25, 1987, 62-70992; Mar. 25, 1987, 62-70993
Int. Cl.[5] F16D *25/11*
U.S. Cl. 192—85 R 8 Claims




8. Apparatus for controlling a hydraulic pressure adapted for use with a clutch comprising:

(a) a plurality of clutch pressure control valves corresponding to a plurality of clutch/piston cylinders, each clutch pressure control valve including:

a pressure control valve having a first spool provided with a solenoid on one end thereof and a first spring on the other end thereof, said pressure control valve switching over an output port thereof to one of a drain port and a pump port connected to a pump in accordance with an instruction current applied to said solenoid and variably changing hydraulic pressure of said output port;

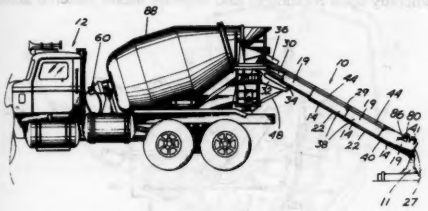
a flow rate detecting valve having a second spool provided with a second spring on one end thereof and the other end thereof being effected by the hydraulic pressure of a clutch port leading to said clutch/piston cylinder, said second spool having a first pressure receiving area on which hydraulic pressure acts to displace said second spool toward a direction to contract said second spring and a second pressure receiving area on which hydraulic pressure acts to displace said second spool toward a direction to expand said second spring, said first pressure receiving area being greater than said second pressure receiving area, said second spool forming a first oil chamber leading to said clutch port, a second oil chamber leading to said output port of said pressure control valve, and a third oil chamber leading to said pump port, said second spool having an orifice formed between said first oil chamber and said second oil chamber, said flow rate detecting valve, when opened by a pressure differential across said orifice, effecting hydraulic pressure of said pump port to act directly on said clutch port via said second oil chamber, said orifice, and said third oil chamber and, when oil is filled into said clutch/piston cylinder, closing said pump port and said clutch port by the effects of the difference in the pressure receiving areas of said second spool and the resilient force of said second spring; and

(b) control means for controlling, at the time of speed change, one of said plurality of clutch/piston cylinders connected with one of said plurality of pressure control valves required for said speed change by outputting an instruction current to said solenoid for said required pressure control valve.

## 5,035,313
## TELESCOPIC CHUTE FOR A MIXER TRUCK

Felesta Smith, 3963 39th Ave., Sacramento, Calif. 95824

Filed May 7, 1990, Ser. No. 519,935
Int. Cl.[5] B65G 11/14
U.S. Cl. 193—2 B 15 Claims



1. A telescopic chute mounted on a mixer truck, said telescopic chute comprising:

an assemblage of at least two elongated open ended and open bottom chute frames generally fully nested together with the open ends of said chute frames generally aligned, said chute frames slidably affixed one said chute frame to another said chute frame to provide means for shortening and lengthening the telescopic chute by way of sliding;

powered means affixed to at least one said chute frame for actuating inward and outward sliding of said chute frames between said generally fully nested and a partially nested position;

at least one removable liner affixed to each said chute frame providing a replaceable surface for flowable material moving through said telescopic chute to flow against;

chute attachment means affixing the assemblage of lined chute frames to said mixer truck to receive dispensed flowable material from a drum of said mixer truck, said chute attachment means including pivotal structuring to allow rotational movement of the assemblage of lined chute frames about a vertical axis, said chute attachment means further including pivotal structuring to allow rotational movement of the assemblage of lined chute frames about a horizontal axis, powered means for actuating the assemblage of lined chute frames about said horizontal axis;

manually actuatable control means adapted for actuating said powered means for actuating said rotation of the assemblage of lined chute frames about said horizontal axis, said control means further adapted for actuating said powered means for actuating said inward and outward sliding of said chute frames.

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## 5,035,314
## GRAVITY ROLLER CONVEYOR CONSTRUCTION

Andrew T. Kornylak, Hamilton, Ohio, assignor to Kornylak Corporation, Hamilton, Ohio

Filed Sep. 28, 1982, Ser. No. 426,112
Int. Cl.[5] B65G 13/00
U.S. Cl. 193—37 9 Claims

1. A rollerway conveyor, comprising:

a support;

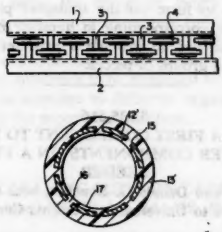
a plurality of substantially identical rollers mounted on said support with generally parallel axes of rotation, lying in a common plane, and aligned with respect to the conveying direction that is perpendicular to the roller axes;

each of said rollers having an outer annular elastomeric tire at least partly extending radially outwardly beyond the remainder of the roller to provide the load engaging surface for the conveyor, with each of said annular tires having an outer peripheral surface and an inner peripheral cylindrical surface;

each of said rollers having a generally tubular rigid cylindrical rim constructed of a material having a plurality of holes extending radially therethrough for supportingly engaging and being permanently bonded concentrically within said annular tire to said inner peripheral surface, wherein the elastomeric material of said annular tire extends through said holes to improve the bond between the rim and the annular tire;

each bonded tire and rim being a replaceable tire subassembly;

each of said rollers including a wheel subassembly comprising an outer peripheral cylindrical surface of a normal diameter greater than the normal interior diameter of the inner cylindrical surface of said replaceable tire subassembly when separate and apart from said wheel subassembly and under the same environmental conditions for purposes of reference;



said conveyor having each of said replaceable tire subassemblies concentrically mounted directly on a corresponding wheel subassembly with a force fit engagement extending directly between the inner cylindrical surface of the tire subassembly and the outer cylindrical surface of the wheel subassembly and with the replaceable tire subassembly inner cylindrical surface frictionally engaging the outer cylindrical surface of the wheels subassembly and thereby providing the sole means supporting the replaceable tire subassembly on said wheel subassembly and preventing relative rotation therebetween; and

the difference in normal diameters providing means for elastic deformation of said subassembly so that said replaceable tire assembly is under tension and said wheel subassembly is under compression to provide an interference fit therebetween.

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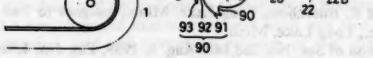
## 5,035,315
## METHOD AND APPARATUS FOR SORTING OBJECTS

Hiroaki Fukusaki, Sakai; Masakazu Umehara, Kawachinagano, and Hiroyuki Gatayama, Sakai, all of Japan, assignors to Tenchi Kikai Kabushiki Kaisha, Sakai, Japan

Filed Mar. 31, 1989, Ser. No. 332,294
Claims priority, application Japan, Jan. 13, 1989, 1-6590
Int. Cl.[5] B65G 47/26
U.S. Cl. 198—419.2 11 Claims



1. A method of sorting, at a sorting section continued from an upstream transport path, pieces of goods continuously supplied from the upstream transport path into groups of pieces, each group consisting of a plurality of pieces, which comprises:

setting the transport speed of pieces on the upstream transport path at a predetermined speed, and supplying for

sorting said pieces sequentially onto a transport plane of the sorting section at predetermined intervals,

counting by counting means the number of pieces supplied onto the transport plane,

controlling the transport speed of pieces between low and high speeds in the sorting section on the basis of the result of the counting and according to a velocity profile comprising alternately successive cycles of the low and high speeds.

controlling the transport speed of pieces in the sorting section at the low speed until the counting of pieces reaches a predetermined value, and when the counting of pieces reaches the predetermined value, controlling the transport speed of pieces in the sorting section at the high speed for a given period of time, and

utilizing the speed difference between the low speed and the high speed to form on the transport plane groups of pieces, each corresponding in number to the predetermined value, and to provide a predetermined interval between said groups of pieces.

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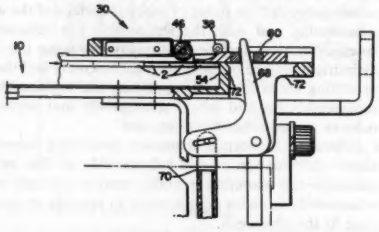
**5,035,316**

## ISOLATING A FIRST COMPONENT TO BE PICKUP FROM OTHER COMPONENTS ON A VIBRATORY FEEDER

**Carl T. Coates, and Dennis G. Boucher, both of Binghamton, N.Y., assignors to Universal Instruments Corporation, Binghamton, N.Y.**

**Filed Jan. 22, 1990, Ser. No. 467,406**
**Int. Cl.[5] B65G *47/26***
**U.S. Cl. 198—459** **8 Claims**



1. In an apparatus for feeding a line of juxtaposed components and presenting a first component of said line to a removal station for subsequent removal therefrom, the improvement comprising:

means for moving a second component of said line away from said first component by an amount sufficient to avoid instances of friction and interference between said first and second components during said removal;

said moving means comprising a wheel engagable with said second component and means, separate from said components, for positively rotating said wheel a particular amount in one direction when said wheel is engaging said second component, in order to effect moving of said second component away from said first component.

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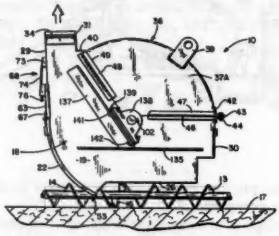
**5,035,317**

## IMPELLER ASSEMBLY WITH ADJUSTABLE IMPELLER

**Floyd E. Buschbom, Long Lake, Minn., assignor to Van Dale, Inc., Long Lake, Minn.**

**Division of Ser. No. 388,140, Aug. 1, 1989, Pat. No. 4,964,502.**
**This application Jun. 25, 1990, Ser. No. 542,538**
**The portion of the term of this patent subsequent to Oct. 23, 2007, has been disclaimed.**
**Int. Cl.[5] B65G *31/04***
**U.S. Cl. 198—642** **22 Claims**

1. A material handling apparatus comprising: a housing having a first side wall, a second side wall laterally spaced from the first side wall, and an end wall secured to said side walls, said housing having a chamber with a material inlet opening and a material outlet opening spaced from said inlet opening, impeller means located within said chamber of the housing operable to move material from the inlet opening and discharge the material through the outlet opening, and means rotatably mounting the impeller means on said housing whereby upon rotation of said impeller means material moves



from the inlet opening toward the outlet opening and is discharged through said outlet opening, the impeller means includes paddle assemblies having outer ends that move adjacent said end wall, the means rotatably mounting the impeller means on said housing includes means for adjusting the position of the impeller means on said housing to adjust the clearance of the outer ends of the paddle assemblies relative to said end wall.

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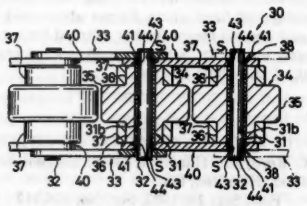
**5,035,318**

## ACCELERATION ACCUMULATING CONVEYOR CHAIN

**Yasukazu Kawabata, 35-8, Nagao-Nishi-machi 3-chome, Hirakata-shi, Osaka-fu; Susumu Hamaguchi, 32-22, Fujisakakita-machi Hirakata-shi, Osaka-fu; Toshio Takahashi, 6-8-404, Kita-Sakurazuka 3-chome, Toyonaka-shi, Osaka-fu; Hiroshi Yokota, 18-5-308, Imafuku-Nishi 2-chome, Joto-ku, Osaka-shi, and Katsutoshi Shibayama, 1-4-1109, Shigino-Nishi 5-chome, Joto-ku, Osaka-shi, all of Japan**

**Filed Jan. 19, 1990, Ser. No. 467,653**
**Int. Cl.[5] B65G *17/00***
**U.S. Cl. 198—779** **14 Claims**



1. An acceleration accumulating conveyor chain, with a link comprising:

a connecting pin having outer link plates at each end thereof;

a bushing coaxially disposed loosely on the connecting pin to define a clearance between the bushing and the connecting pin;

a larger diameter article carrying a roller and a smaller diameter running roller coaxially disposed on the bushing; and,

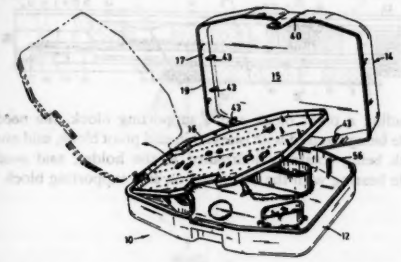
inner link plates at both ends of said bushing, the inner link plates defining apertures dimensioned to loosely receive the ends of said bushing to define a clearance between the inner link plates and the ends of the bushing, wherein a rotation prevention mechanism is provided between the ends of said bushing and the inner link plates to prevent relative rotation of said bushing and the inner link plates.

**5,035,319**

## JEWELRY STORAGE CASE

**Hans P. Kunisch, 344 Colebourne Rd., Rochester, N.Y. 14609**

**Filed Jun. 7, 1990, Ser. No. 536,158**
**Int. Cl.[5] A45C *11/00*; B65D *6/00***
**U.S. Cl. 206—6.1** **29 Claims**



1. A jewelry storage case for securely holding large and small jewelry comprising:

a base receptacle having a bottom surface and a peripherally extending outer wall, said base receptacle having at least one upstanding wall member extending upward from said bottom surface terminating in an upper terminal end forming a substantially closed receptacle area for holding jewelry;

a lid secured to said base receptacle by first hinge means such that said lid can rotate about a first axis; and

a shelf secured to said base by a second hinge means such that said shelf rotates about a second axis, said shelf having a top surface and a bottom surface; said shelf being mounted to said base receptacle such that when said lid is in the closed position said bottom surface is in substantial contact or closely adjacent with said terminal end of said upstanding wall member, said shelf having means for holding jewelry.

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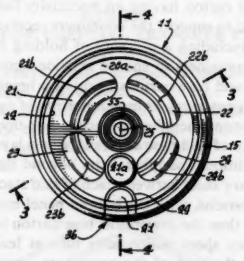
**5,035,320**

## DISPENSER SYSTEM WITH ELONGATED SELECTIVELY ACTIVATABLE DISPENSING PUSHER

**Clifford Plone, 222 North Buena Vista, #101, Burbank, Calif. 91505**

**Filed May 7, 1990, Ser. No. 520,276**
**Int. Cl.[5] B65D *25/08***
**U.S. Cl. 206—219** **24 Claims**



1. In a dispenser for dispensing dispensable substance or substances, the combination comprising

a) carrier structure,

b) elongated pusher structure on the carrier structure,

c) elongated receptacle structure beneath the pusher structure and on the carrier structure, there being an elongated zone or zones between the pusher structure and receptacle structure to receive the dispensable substance or substances,

d) the pusher structure being selectively manually deflectable toward the receptacle structure, at selected locations along the length of the pusher structure length,

e) the receptacle structure being frangible at selected lengthwise locations corresponding to said selected locations along the length of the pusher structure, and in response to deflection of the pusher structure,

f) whereby dispensing of the dispensable substance or substances occurs at said selected lengthwise locations of the receptacle structure,

g) the pusher structure including at least one elongated pusher having a length which is at least about three times its width, and having arching extent over its width so as to project upwardly from the carrier structure, and including a deflector integral with said arching extent to project downwardly in said arching extent toward the receptacle structure, along the elongated length of the pusher, whereby a user can progressively run his finger lengthwise along the pusher to deflect the pusher variably along its length and to an extent corresponding to the amount of dispensable substance to be dispensed from the receptacle structure in response to deflector engagement with and opening of the receptacle structure.

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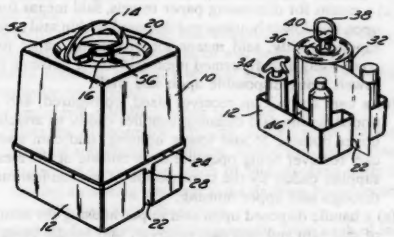
**5,035,321**

## CLEANING SUPPLIES CADDY

**Thomas A. Denton, 797 Phelan Rd., #9, Pinon Hills, Calif. 92372**

**Continuation-in-part of Ser. No. 384,452, Jul. 21, 1989. This application Apr. 18, 1990, Ser. No. 510,974**
**Int. Cl.[5] B65D *81/36*, *85/671***
**U.S. Cl. 206—225** **9 Claims**



1. A cleaning supplies caddy comprising:

(a) a lower housing having a first wall substantially about its perimeter for receiving and containing cleaning supplies, the first wall for maintaining the cleaning supplies within said lower housing;

(b) an upper housing removably attachable to said lower housing and capable of being used as a container for liquids when removed from said lower housing and inverted;

(c) a rotatable first shaft for transmitting rotational motion through said upper housing, said first shaft passing through said upper housing;

(d) a handle attached to the upper end of said first shaft for rotating said first shaft, said handle also suitable for carrying the container

(e) a latch mechanism sized, configured, and positioned within said cleaning supplies caddy, said latch mechanism actuatable by the rotation of said shaft, for removably attaching said upper housing to said lower housing.

(f) a seal disposed intermediate said shaft and said upper housing, said seal permitting rotation of said shaft and capable of preventing the flow of water between said shaft and said upper housing; and

(g) a second shaft formed upon said lower housing, said second shaft suitable for receiving and dispensing paper towels.

6. A cleaning supplies caddy comprising:

(a) a lower housing;

(b) an upper housing removably attachable to said lower housing;

(c) a cam and a cam receiver, said cam and said cam receiver being sized, configured, and positioned within said cleaning supplies caddy to attach said upper housing to said lower housing, said cam and said cam receiver being operable from outside of the cleaning supplies caddy by the transmission of mechanical motion through said upper housing;

(d) a handle disposed upon said upper housing for actuation of said cam and said cam receiver, said handle being suitable for carrying said container;

(e) a means attached to said handle for transmitting mechanical motion from said handle through said upper housing to said cam and said cam receiver, said means for transmitting mechanical motion through said upper housing comprising a rotatable shaft which passes through said upper housing to transmit rotational mechanical motion through said upper housing to engage and disengage said cam and said cam receiver, said means for transmitting mechanical motion further comprising an O-ring disposed intermediate said shaft and said upper housing, said O-ring permitting rotation of said shaft and capable of preventing the flow of water between said shaft and said upper housing; and

(f) means for dispensing paper towels, said dispensing means disposed upon said lower housing and comprising a second shaft formed upon said lower housing, paper towels being disposable upon said second shaft.

7. A cleaning supplies caddy comprising:

(a) a lower housing suitable for containing cleaning supplies;

(b) an upper housing removably attachable to said lower housing, said upper housing suitable for use as a wash bucket;

(c) a means for dispensing paper towels, said means formed upon said lower housing and disposed within said cleaning supplies caddy, said means for dispensing paper towels comprising a shaft formed upon said lower housing, paper towels being disposable upon said shaft;

(d) a cam and a cam receiver sized, configured, and positioned within said cleaning supplies caddy to attach said upper housing to said lower housing, said cam and said cam receiver being operable from outside of the cleaning supplies caddy by the transmission of mechanical motion through said upper housing;

(e) a handle disposed upon said upper housing for actuation of said cam and said cam receiver, said handle being suitable for carrying said container; and

(f) a means attached to said handle for transmitting mechanical motion through said upper housing to said latch mechanism, said means for transmitting mechanical motion through said upper housing comprising a rotatable shaft which passes through said upper housing to transmit rotational mechanical motion through said upper housing to engage and disengage said cam and said cam receiver.

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**5,035,322**

## ROD MAGAZINE FOR ELECTRICAL OR ELECTRONIC COMPONENTS

**Franciscus C. M. Faes; Josephus M. M. Van Gastel; Johannes T. A. Van De Ven, and Petrus A. C. Verberne, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

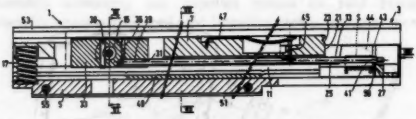
**Filed May 1, 1990, Ser. No. 517,267**

**Claims priority, application Netherlands, Nov. 3, 1989, 8902715**

**Int. Cl.[5] B65D *73/02***

**U.S. Cl. 206—328** **25 Claims**

1. A rod magazine extending in a given direction for holding components comprising a rod-shaped holder having a bottom portion, a roof portion and two sidewall portions extending in said given direction, which portions enclose a magazine chamber extending in said direction, which chamber has a substantially U-shaped cross-section, which rod magazine further comprises a component support needle guide for receiving and supporting components to be secured to the holder, said guide extending in said given direction suspended freely through the magazine chamber throughout the guide length, said magazine



including a pivot block and a supporting block, the needle guide being secured with one end in said pivot block, said pivot block being rotatably journalled in the holder, said needle guide bearing with the other end on said supporting block.

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**5,035,323**

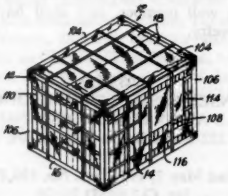
## SHIPPER DISPLAY

**Thomas C. Daniels, Bradenton; Patricia M. Jeruzal, and Griscom Bettle, III, both of Sarasota, all of Fla., assignors to Tropicana Products, Inc., Bradenton, Fla.**

**Filed Mar. 2, 1990, Ser. No. 487,318**

**Int. Cl.[5] B65D *19/00***

**U.S. Cl. 206—386** **36 Claims**



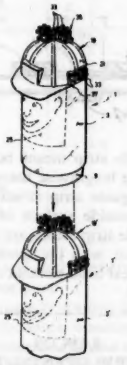
1. A shipper display for rigid containers comprising a plurality of base cartons each receiving a plurality of said containers, each said base carton having an essentially flat bottom panel means adapted to support the containers received therein, said base cartons including a plurality of holding means for positioning said containers in spaced relation across said bottom panel means, said base cartons being of a height less than the height of the containers, at least a portion of said base cartons carrying said containers being stacked one upon the other so that a plurality of said base cartons forms a layer of said stack free of an additional peripheral rim beyond that of each base carton; a unitary sheet between each of said stacks of said array of said base cartons, with the bottom panel means of the base cartons other than the lowermost base carton being supported by said unitary sheet which is in turn at least substantially supported by the tops of the containers carried by the base cartons below it in the stack said peripheral sheets being free of a peripheral rim and apertures or recesses in registration with the tops of the containers carried by the base cartons below it in the stack; at least one top carton coupled to the tops of the uppermost of at least a portion of the containers in the upper most carton in the stack; and means for releasably retaining the stack as a unit for shipment, whereby the stack is suitable for display upon release of said retaining means and removal of said top carton.

5,035,324

## TOY PACKAGING

Victor J. Bertrand, Ile Bizard, Canada, assignor to The Ritvik Group Inc., Dorval, Canada

Filed Feb. 7, 1990, Ser. No. 476,250
Int. Cl.[5] B65D *75/00*
U.S. Cl. 206—457 11 Claims



1. A toy packaging comprising:

a hollow cylindrical container for containing sundry articles, said container having an open end and a closed end;

means removably fixed to said open end to close said open end; and

a toy hat mounted on one of said ends so as to be completely removable therefrom, said toy hat having a cup-shaped portion sized to fit over a child'head;

wherein said cup-shaped portion of said toy hat is of such a diameter as to snugly fit onto said one end of said container;

wherein said toy hat is removably mounted onto said container by press-fitting of said cup-shaped portion onto said one end of said container; and

wherein said packaging further comprises a full-sized picture of a child's face onto a wall portion of said container adjacent said one end,

whereby, when said toy hat is pressed-fitted onto said container, it seems to be worn by said child whose face is on the picture.

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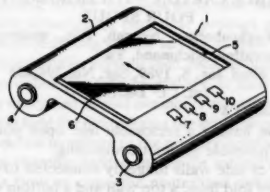
5,035,325

## CASSETTE FOR THERMAL TRANSFER PRINTING FILM

Kengo Kitsuki, Tokyo, Japan, assignor to Dai Nippon Insatsu Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 16, 1990, Ser. No. 552,508
Claims priority, application Japan, Jul. 18, 1989, 1-84178
Int. Cl.[5] B65D *73/00, 85/67*
U.S. Cl. 206—459 14 Claims




1. A thermal transfer printing film cassette having a cassette case, and a thermal transfer printing film housed inside said cassette case, said cassette having an outer surface provided with a plurality of marking positions, and at least one reflective mark applied to one of said positions, said reflective mark, depending upon its position, indicating the ink characteristics of the thermal transfer printing film.

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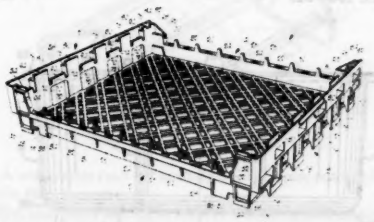
5,035,326

## MULTI-LEVEL BASKET

Edward L. Stahl, Lee's Summit, Mo., assignor to Piper Industries of Texas, Inc., Orlando, Fla.

Filed Sep. 5, 1989, Ser. No. 402,684
Int. Cl.[5] B65D *21/04*
U.S. Cl. 206—507 2 Claims



1. A basket adapted for alternate high-elevation stacking, low-elevation nesting, and third elevation storage with a similarly configured basket comprising:

a substantially rectangular, normally horizontally oriented floor;

a normally upright front end wall integrally formed with said floor;

a normally upright rear end wall integrally formed with said floor and opposed to said front end wall; and

a pair of opposed, normally upright sidewalls, each of said sidewalls comprising:

an upper rim extending along said side wall,

a plurality of normally upright, spaced-apart stacking posts of substantially uniform width and height interconnected by said rim, each of said stacking posts including a stacking platform and a stacking lip projecting normally upwardly therefrom,

a stacking foot projecting downwardly from each of said stacking posts and formed integrally therewith, each of said stacking feet positioned outwardly of said floor to present a space therebetween,

a plurality of nesting ledges each of said ledges being located adjacent to a respective one of said stacking posts, said nesting ledges being of complimentary width to said stacking feet for supporting the stacking feet of said similarly configured basket thereon, each of said nesting ledges, having a normally upright nesting lip for resisting side to side movement of the stacking feet of said similarly configured basket when the stacking feet of the similarly configured basket are supported by said nesting ledges, said nesting lips being oriented for positioning within the space between the stacking feet and floor of the similarly configured basket,

said upper rim extending normally upwardly of said stacking lips,

said front end wall including a stacking lug projecting upwardly from a stacking shelf adjacent each of said side walls, and a stacking toe oriented normally below said stacking lug and projecting outwardly of said floor to present a gap therebetween, said stacking toe being located for receiving the stacking lug of the similarly configured basket in said gap to limit relatively front-to-rear movement between said basket and the similarly configured basket when said basket is stacked in superposed relationship to the similarly configured basket with the

stacking toe of said basket positioned on a stacking shelf of the similarly configured basket,

said nesting lips being oriented to define a drainage slot between said nesting lips and an adjacent stacking post for draining accumulated liquid from said nesting ledge.

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**5,035,327**

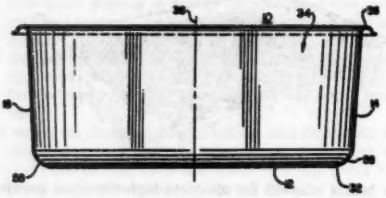
**RECEPTACLE ADAPTABLE FOR NESTED STACKING**

**Dirk E. Denzin; Robert E. Lull, both of West Bend, and Alan J. Schommer, Fredonia, all of Wis., assignors to The Vollrath Company, Inc., Sheboygan, Wis.**

**Continuation of Ser. No. 463,113, Jan. 11, 1990, abandoned. This application Nov. 15, 1990, Ser. No. 614,039**

**Int. Cl.[5] B65D *21/02***

**U.S. Cl. 206—518** **3 Claims**



2. An improved receptacle adaptable for nested stacking, said receptacle being generally symmetrical about a vertical plane and having a generally polygonal bottom and a plurality of walls, said bottom and said plurality of walls cooperating to form an open-topped well having a plurality of corners and a top end, the improvement comprising a plurality of stop means for limiting depth of insertion of the receptacle within an adjacent lower receptacle in a nested orientation, said plurality of stop means being distributed among said plurality of corners, each of said plurality of stop means comprising an integrally formed depression in a respective corner of said plurality of corners, said depression depending outwardly of said well and including a first portion and a second portion, said first portion depending from said respective corner at a first intersection toward said bottom and defining an acute angle with a reference line; said reference line intersecting said first intersection and being parallel with said vertical plane in a reference plane, said reference plane substantially containing said respective corner; said second portion joining said first portion with said respective corner at a second intersection and presenting a first abutting surface to an adjacent lower receptacle in a nested orientation; said stop means further comprising a generally planar shelf positioned at each of said plurality of corners, each said shelf lying generally in a horizontal plane above said first portion, said horizontal plane being substantially perpendicular with said vertical plane; each respective corner of said plurality of corners being of rounded configuration having a first radius; each said shelf being terminated adjacent said well by a boundary having a second radius, said second radius being greater than said first radius, each said shelf presenting a second abutting surface for engaging a similar first abutting surface of an adjacent upper receptacle in a nested orientation.

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**5,035,328**

**COMPOSITE TEAR STRIP OPENING DEVICE WITH CARRIER STRIP FEATURE**

**Myun H. Kim, 141 Meserole Ave. #2L, Brooklyn, N.Y. 11222**

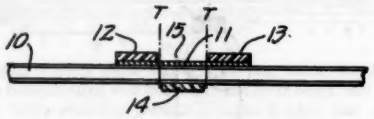
**Filed Jun. 12, 1990, Ser. No. 536,537**

**Int. Cl.[5] B65D *65/26, 65/34, 75/68***

**U.S. Cl. 206—605** **10 Claims**

1. A tear strip opening device for opening of a container wall, wherein a pair of spaced-apart, elongated guide strip means are mounted in parallel relation on the outer surface of a tearable container wall, and an elongated tear band element is mounted on the inside surface of the container wall, generally opposite the space between said guide strip means, characterized by

(a) said opening device comprising an independent, composite guide strip structure, separate from said tear band element, including a thin carrier strip formed of a material easily tearable in the longitudinal direction, and spaced-



apart parallel guide strip means bonded to said carrier strip and extending lengthwise thereof,

(b) said composite guide strip structure being adhesively secured to said outside surface of the container wall, whereby said guide strip means are effectively bonded to said outside surface, with the space therebetween being aligned with said tear band element on the opposite side of the container wall.

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**5,035,329**

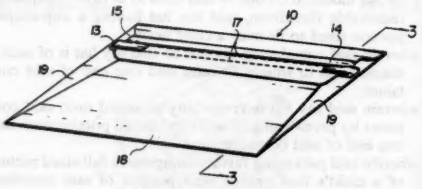
**TEAR STRIP OPENING DEVICE**

**Myun H. Kim, 42-16 80th St., Apt. 6B, Elmhurst, N.Y. 11373**

**Filed Dec. 30, 1986, Ser. No. 947,806**

**Int. Cl.[5] B65D *3/26***

**U.S. Cl. 206—615** **7 Claims**



1. A device for opening a sealed container, wherein the container has a sealing portion having inside and outside surfaces, which comprises;

(a) a non-tearable band sealably attached to the outside surface of said sealing portion of the container, and

(b) a non-tearable strip sealably attached to the inside surface of said sealing portion of the container, said band and said strip being disposed substantially parallel to each other whereby when the strip is freed and pulled away from the sealed container, the container can be readily opened with straight tear lines which extend along the non-tearable band of said container.

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**5,035,330**

**RECLOSABLE CARTON WITH HORIZONTAL SIDE POUR SPOUT**

**Morris W. Kuchenbecker, Neenah, Wis., assignor to James River Corporation, Richmond, Va.**

**Filed Jan. 6, 1989, Ser. No. 294,433**

**Int. Cl.[5] B65D *5/70***

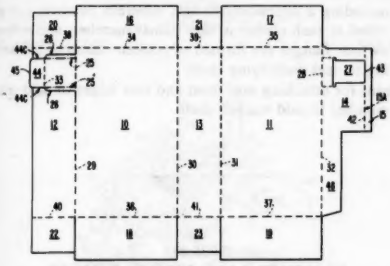
**U.S. Cl. 206—621.4** **38 Claims**

1. A carton having a reclosable tear open pour spout for dispensing a pourable product comprising:

a plurality of side walls hingedly connected to one another by way of fold lines, a top wall and a bottom wall, with at least one of said side walls including an inner panel hingedly connected to one of said plurality of side walls by way of a fold line and having lateral edges and an outer

panel hingedly connected to another of said plurality of side walls by way of a fold line and secured to said inner panel;

a discharge opening of a predetermined dimension formed in said inner panel, the entire perimeter of said discharge opening being spaced inwardly relative to each of said



lateral edges and said fold line between said one side wall and said inner panel; and

a closure means integrally formed in said outer panel and overlying said discharge opening, said closure means being hingedly connected at one end thereof to said another side wall along said fold line between said outer panel and said another side wall.

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**5,035,331**

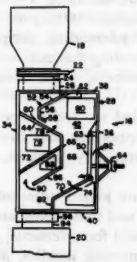
## METHOD AND APPARATUS FOR REMOVING DUST AND DEBRIS FROM PARTICULATE PRODUCT

**Jerome I. Paulson, 969 Edinburgh Dr., Lancaster, Pa. 17601**

**Filed Aug. 14, 1989, Ser. No. 393,642**

**Int. Cl.[5] B07B** *7/04*

**U.S. Cl. 209—3** **20 Claims**



1. A dedusting device for separating dust and similar unwanted debris adhering to particular product and entrained therewith, said dedusting device having at least one chamber defining a substantially vertical feed path through which said particulate product free falls by gravity, at least one coil surrounding an entry end of said chambers and adapted to generate a magnetic field for neutralizing the static electricity charge causing the debris to adhere to the primary product and at least one cleaning chamber having means for subjecting said product to an air flow to cause the neutralized debris to separate from the heavier product, characterized by means for varying the level and intensity of said magnetic field whereby the static charge of the debris is more effectively neutralized.

**5,035,332**

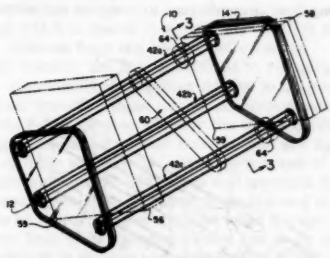
## COLLAPSIBLE RACK FOR BOOKS, TAPES, COMPACT DISCS AND THE LIKE

**David M. Stravitz, 16 Park Ave., Ste. 14A, New York, N.Y. 10016**

**Continuation-in-part of Ser. No. 307,590, Feb. 7, 1989. This application Dec. 15, 1989, Ser. No. 452,124**

**Int. Cl.[5] A47B** *63/00*

**U.S. Cl. 211—40** **26 Claims**



1. A collapsible rack for holding books, tapes, compact discs and the like, comprising:

a first end panel having at least two sockets formed therein;

a second end panel having at least two sockets formed therein;

each of said first and second end panels having an inner and an outer surface;

each said socket including an aperture and a slot in communication with said aperture;

at least two cross members extending between said end panels and engageable with said end panels for securing said end panels together;

each of said cross members having a first end for insertion through one said aperture of one of said sockets of said first end panel and a second end for insertion through one said aperture of said sockets of said second end panel;

each end of each said cross member having:

a securing tab for insertion through one said slot and for engaging said outer surface of said respective end panel when inserted through said slot, and

limiting and stabilizing surface means for engaging an inner surface of said respective end panel for thereby limiting the extent of travel of said securing tab through said slot and for preventing tilting of said cross member relative to said respective end panel; and

said inner and outer surface of each end panel surrounding each aperture having a predetermined thickness such that, upon engagement of said securing tab with said outer surface and engagement of said limiting and stabilizing surface means with said inner surface, rotation of any said cross member in one said aperture results in releasably and non-tiltingly locking siad end of said cross member to said respective end panel with a tightening fit.

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**5,035,333**

## ARRANGEMENT FOR CONSTRUCTING A MICRO-OPTIC BENCH

**Hartmut Klingner, Göttingen, Fed. Rep. of Germany, assignor to Spindler & Hoyer GmbH & Co., Göttingen, Fed. Rep. of Germany**

**Filed May 20, 1983, Ser. No. 496,443**

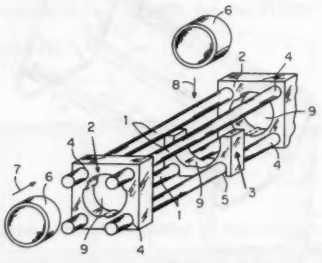
**Claims priority, application Fed. Rep. of Germany, May 24, 1982, 3219399**

**Int. Cl.[5] A47F** *7/00*

**U.S. Cl. 211—41** **8 Claims**

1. Arrangement for constructing a micro-optic bench, comprising: mounts for holding optical elements and having perforations; rods extending through said perforations, means in said perforations for locking said rods into position on the mounts;

said means having positive snap-together fastenings in vicinity of said perforations through the mounts; said fastenings securing the mounts in place on the rods to prevent accidental displacement of said rods without supplementary attachment means; said mounts being axially slidable along said rods, said optical elements being securely held by said mounts; said perforations comprising first perforations having continuous circumferences and second perforations having discontinuous circumferences through the mounts with one side of the perforations open; said perforations having knobs and ribs distributed along their circumference to comprise said snap-together



fastenings; said knobs and ribs in said second perforations with a discontinuous circumference being distributed along more than 180° of their circumference; said perforations having area in the mounts sufficiently elastic to ensure a satisfactory snap-together fastening; said second perforations through mounts having a discontinuous circumference for positioning on or taking off the rods after assembly of said arrangement; said second perforations with discontinuous circumference having lateral accesses; said perforations having a shape and size coordinated with the shape and size of a cross-section of round rods to form snap-together fastenings.

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**5,035,334**

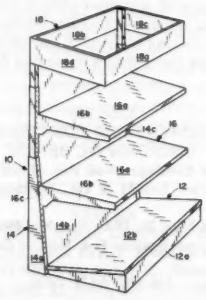
## SHELVING APPARATUS HAVING A REPAIR COVER

**Jerry C. Messick, Jr., Julian, N.C., assignor to McCalla/-Lackey Products Corporation, Hickory, N.C.**

**Continuation of Ser. No. 323,256, Mar. 10, 1989, Pat. No. 4,890,374, which is a continuation of Ser. No. 248,303, Sep. 21, 1988, abandoned, which is a continuation of Ser. No. 20,168, Feb. 27, 1987, abandoned, which is a continuation of Ser. No. 767,439, Aug. 20, 1985, abandoned. This application Oct. 30, 1989, Ser. No. 458,594**

**Int. Cl.[5] A47F *5/00***

**U.S. Cl. 211—134** **2 Claims**



1. A shelving apparatus comprising:

a shelf having a generally flat planar surface for the placement of goods thereon said flat surface being worn and marred due to continued use;

said shelf having a narrow edge adjacent said flat surface, said edge being worn and unsightly from use;

a cover for said shelf to give the shelf the appearance of an unworn shelf comprising a planar member having a front edge, rear edge, and side edges, and a generally large flat surface of substantially the same dimension as said large flat surface of said shelf;

said front, rear and side edges of said planar member each including a depending flange, wherein cut-outs are provided at each corner of said planar member, and wherein all four flanges are formed of resilient material for securing to said underlying shelf;

means for attaching said front and rear edges of said planar member to said marred shelf.

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**5,035,335**

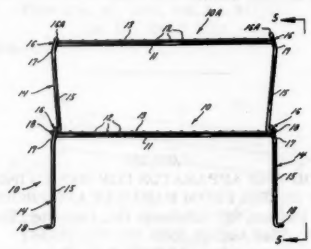
## STACKABLE AND NESTIBLE BACKS

**Mohammad E. Massoudnia, Creve Coeur, Mo., assignor to Gusdorf Corporation, St. Louis, Mo.**

**Continuation of Ser. No. 351,581, May 15, 1989, abandoned. This application Sep. 13, 1990, Ser. No. 582,788**

**Int. Cl.[5] A47B *47/00***

**U.S. Cl. 211—188** **8 Claims**



1. A rack, constructed of wire components, comprising:

first means, in an upper portion of the rack, for supporting articles thereupon, including a load-bearing, wire structure (a) occupying substantially only one, given plane, and (b) formed of fully bounding, peripheral wire;

second means, for setting the rack on a bearing surface such as a floor, or platform, or the like, comprising wire foot elements; and

third means, coupled to, and cooperative with, said foot elements, for supporting said first means in elevation, comprising substantially straight, wire, leg members; wherein

said leg members are joined, adjacent first ends thereof, to opposite ends of said first means, and are joined at second ends thereof to said foot elements; and

fourth means, comprising handles, joined to said opposite ends of said first means, and elevated from said first means; wherein

said foot elements include a wire transversely bridging across one of said second and third means for fixing said leg members spaced apart from each other;

said foot elements further comprise means for latchingly engaging one of said first and fourth means of a second rack having substantially the same construction as the aforesaid rack, in order to stack said second rack thereupon; and

said latchingly engaging means comprises given, bent portions of said foot elements for receiving, therewithin, one of said first and fourth means of the aforesaid, second rack.

**5,035,336**

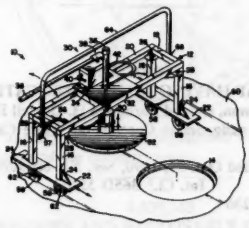
## COMPACT COLLAPSIBLE MANHOLE COVER LIFTER

**Robert J. Schmitz, 16835 Jalisco Ter. East, Lakeville, Minn. 55044, and Dean R. Quam, 1602 73rd Ave. No., Brooklyn Park, Minn. 55444**

**Continuation-in-part of Ser. No. 279,942, Dec. 5, 1988, abandoned, which is a continuation of Ser. No. 40,031, Apr. 20, 1987, Pat. No. 4,789,072. This application Feb. 7, 1990, Ser. No. 476,321**

**Int. Cl.[5] B66C *23/18***

**U.S. Cl. 212—166** **14 Claims**



1. A portable device for handling manhole covers, comprising:

a mobile frame adapted to straddle a manhole;

said frame including a raised transverse portion having opposite ends, and a pair of spaced-apart upright portions each having top and bottom ends;

means for securing the upright portions to the ends of the transverse portion of said frame for pivotal movement about transverse axes toward and away from each other between a retracted position adjacent the transverse portion and an extended position with the top ends of the upright portions in stopped engagement with the ends of the transverse portion;

attachment means for selective engagement with the manhole cover; and

lifting means mounted on the transverse portion of said frame for connection with said attachment means for selectively lifting and lowering the cover.

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**5,035,337**

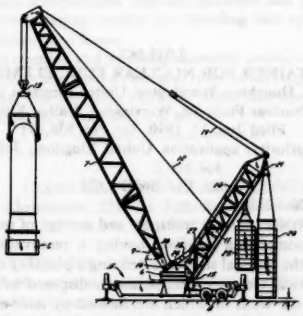
## MOBILE CRANE WITH COUNTERWEIGHT AND AUXILIARY COUNTERWEIGHT

**Dieter C. Juergens, Mathis, Tex., assignor to Deep South Crane & Rigging Co., Baton Rouge, La.**

**Filed Sep. 13, 1990, Ser. No. 581,876**

**Int. Cl.[5] B66C *23/76***

**U.S. Cl. 212—196** **7 Claims**



1. A crane for lifting heavy loads, comprising a platform rotatable on a base about a vertical axis, an elongated boom having upper and lower ends, a boom connection between the platform and the boom, at the lower end of the latter, confining the boom to swinging relative to the platform substantially in a plane containing said vertical axis, and a load line trained over the upper end of the boom and having one end connected to a winch and an opposite free end portion connectable with a load to be lifted, said crane being characterized by:

A. an elongated spar having opposite front and rear ends, said spar

(1) being substantially shorter than said boom and

(2) having at its front end a spar connection with the platform

(a) which is spaced in a rearward direction along the platform from said boom connection and

(b) whereby the spar is confined to swinging motion substantially in said plane relative to the platform;

B. means providing a lost motion connection between the platform and the spar whereby the spar is confined to a range of swinging motion between opposite upper and lower limits and through which the rear end of the spar projects beyond the platform in said rearward direction;

C. a counterweight so connected to the rear end of the spar as to be supported by the ground when the spar is at the lower limit of its swinging motion but to be otherwise pendent from the spar and supported by it; and

D. a tension connection between the upper end of the boom and the rear end of the spar whereby a constant distance is maintained between those ends, said distance being such that, throughout said range of swinging motion of the spar, the boom is maintained at a forward and upward inclination to said vertical axis.

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**5,035,338**

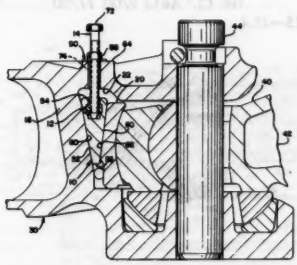
## SLACKLESS RAILCAR CONNECTIONS WITH EXTRACTABLE WEDGE

**Horst T. Kaufhold, Chicago, Ill., and Russell G. Altherr, Munster, Ind., assignors to AMSTED Industries Incorporated, Chicago, Ill.**

**Filed Feb. 23, 1990, Ser. No. 483,876**

**Int. Cl.[5] B61G *5/02, 7/10***

**U.S. Cl. 213—50** **11 Claims**



1. A method for extracting and replacing a gravity wedge respecting an operating position between two parts of a slackless railcar connection, located within a carbody sill structure, said method comprising:

providing an engaging means at the upper end of said wedge;

inserting a lifting means through an opening provided in the ceiling of said carbody sill toward said engaging means;

securing said lifting means to said engaging means by contacting said engaging means with said lifting means and manipulating said lifting means so as to become fastened thereto;

pulling upwardly on said lifting means whereby to extract said wedge from between said two parts to an upward location;

holding said wedge at said upward location;

lowering said wedge from said upward location to said operating position; and

releasing said lifting means from said engaging means.

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5,035,339

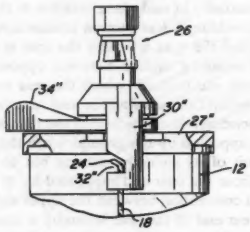
## UNIVERSAL SPRAYER CANISTER

Richard W. Meyersburg, Tenafly, N.J., assignor to VMC Industries, Inc., Philadelphia, Pa.

Continuation of Ser. No. 43,502, Apr. 28, 1987, abandoned. This application Nov. 23, 1988, Ser. No. 275,686

Int. Cl.[5] B65D *1/16, 1/42, 41/06, 41/00*

U.S. Cl. 215—1 C 17 Claims




1. A plastic canister for sprayers, said canister having a closed bottom end, and an open top end, and radially opposed cover engaging means integral with the outer surface of the canister adjacent the open top end, said cover engaging means each comprising a rib projecting outwardly from the canister and having an opening therethrough for receiving an engagement element of a sprayer, means for reinforcing that portion of the rib at the uppermost portion of the opening to withstand the clamping forces applied to the rib by the attachment of a sprayer cover apparatus to the canister.

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5,035,340

## VALVED NIPPLE FOR BABY BOTTLE

Sarah J. Timmons, 10 Turners Cir., Lexington, S.C. 29072

Filed Feb. 26, 1990, Ser. No. 484,679

Int. Cl.[5] A61J *9/00, 11/00*

U.S. Cl. 215—11.4 4 Claims

3. A baby bottle system, comprising;

a bottle;

a hollow, pliant nipple releasibly attached to said bottle and having an aperture at one end and an opening in an opposing, bottle engaging end; and

valve means interior to said nipple for allowing a flow of liquid from said bottle as the baby opens said valve means by compressing said nipple, said valve means having an opening side and an aperture side and a passage therethrough connecting said opening side and said aperture side, said opening side of said valve means and said nipple defining a first chamber and said aperture side of said valve means and said nipple defining a second chamber, said first and said second chambers communicating through said passage, said aperture side of said valve means facing said aperture, said opening side of said valve means facing said opening;

said valve means further comprising a flap adjacent said opening side of said valve for covering said passage, said flap having an edge, said edge having an attached portion and an unattached portion, said unattached portion separating from said opening side toward said bottle to open said valve means when said nipple is compressed and engaging said opening side to close said valve means when said nipple is released.

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5,035,341

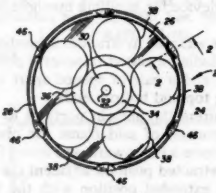
## CLOSURE CAP HAVING TAMPER INDICATING MEANS

Robert J. Heilman, Orland Park, and H. Darrell Iler, Wheaton, both of Ill., assignors to Continental White Cap, Inc., Norwalk, Conn.

Filed Oct. 31, 1990, Ser. No. 606,869

Int. Cl.[5] B65D *55/02*

U.S. Cl. 215—230 12 Claims



1. A closure cap having tamper indicating means, said closure cap comprising a cap member including an end panel having incorporated therein a mechanically actuated button, said button having a normal down position, actuating means carried by said end panel for automatically moving said button to an up position when said cap member is applied to a container, said tamper indicating means including a translucent panel carried by said cap member in overlying relation to said end panel spaced from said button in said button down position and engageable by said button in said button up position, a film disposed intermediate said button and said translucent panel, and indicia forming means selectivey carried by said film and said translucent panel for indicating the status of said closure cap.

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5,035,342

## CONTAINER FOR NUCLEAR FUEL ELEMENTS

Anthony T. Houghton, Warrington, United Kingdom, assignor to British Nuclear Fuels plc, Warrington, United Kingdom

Filed Jun. 11, 1990, Ser. No. 536,271

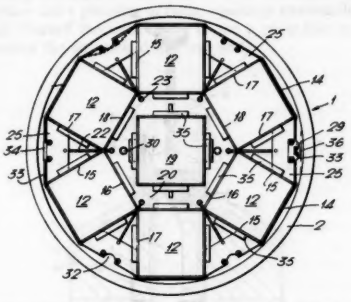
Claims priority, application United Kingdom, Jul. 8, 1989, 8915700

Int. Cl.[5] B65D *1/24*

U.S. Cl. 220—23.2 4 Claims

1. A container for the transport and storage of nuclear fuel elements comprising a vessel having a removable internal structure, the internal structure defining a plurality of substantially identical elongate compartments disposed in a circular array and the walls of which are formed by inter-engageable elongate rectangular plates disposed substantially at right angles to one another with spider assemblies located at intervals along the length of the array, each spider assembly including

an inner plate having side edges cooperable with the inner walls of the compartments and having arms passing through



the walls to carry outer plates engageable with radially extending side walls of the compartments.

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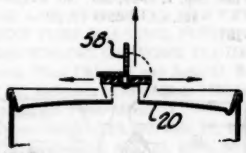
**5,035,343**

## EASY-OPEN AND RECLOSABLE CONTAINER

**Jay Morton, Miami Beach, Fla., assignor to The City of Hope, Duarte, Calif. and Lucille T. Morton, Miami Beach, Fla., a part interest**

**Filed Dec. 13, 1989, Ser. No. 451,461**
**Int. Cl.[5] B65D *17/32***
**U.S. Cl. 220—270** **13 Claims**



1. An easy-open and reclosable container comprising:
a container body portion having a bottom end panel,
a container top lid having a non-circular opening portion severable from said top lid to provide an aperture,
an opening and resealing assembly fastened on said opening portion by a central pivot means and including a grip means hinged to said central pivot means and being adapted to move said opening portion vertically and rotate said opening portion horizontally about said central pivot means for respectively opening and locking the same, a compression seal means dimensioned to overlie said aperture and disposed between said grip means and said opening portion for resealing said aperture under a downward force,
said opening and resealing assembly cantilevered on an arm extending from an integral rivet on said top lid for displacing said resealing assembly while said opening portion is separated from said top lid.

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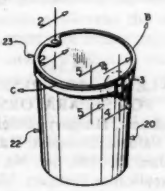
**5,035,344**

## CLOSURE FOR PORTABLE CONTAINER

**Gary Christopher, 5211 La Jolla Blvd., La Jolla, Calif. 92037**

**Filed Jan. 31, 1990, Ser. No. 472,733**
**Int. Cl.[5] B65D *43/18***
**U.S. Cl. 220—336** **1 Claim**

1. A closure apparatus especially adapted for use in combination with a receptacle,
said receptacle including an upstanding sidewall having an upper edge defining an open end in said receptacle,
and for normally closing said receptacle and for providing improvements in access to said receptacle, said closure apparatus comprising:
(a) a lid;
(b) pivot means pivotally affixing said lid to said receptacle for rotational movement about a vertical axis, from
(i) a closed position, to
(ii) an open position;
(c) seal means including
(i) an element of a male/female engagement pair extending



continuously along the upper edge of the sidewall of said receptacle, and
(ii) a complemental element of said male/female engagement pair carried by said lid;
(d) biasing means normally retaining said element in mating engagement with said complemental element when said lid is in the closed position; and
cam means opposing said biasing means for disengaging said element from said complemental element as said lid is moved from the closed position toward said open position.

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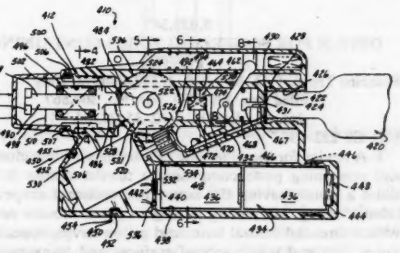
**5,035,345**

## AUTOMATIC INFLATOR FOR INFLATABLE ARTICLES

**Michael Janko, Anchorville; Ray Moran, Grosse Pointe Farms, and Norman Carlson, Rochester, all of Mich., assignors to APOC, Inc., New Baltimore, Mich.**

**Filed May 7, 1990, Ser. No. 519,749**
**The portion of the term of this patent subsequent to Nov. 27, 2007, has been disclaimed.**
**Int. Cl.[5] B67D *5/00***
**U.S. Cl. 222—5** **36 Claims**



1. An inflator for inflatable articles comprising:
a housing;
means, formed in the housing, for discharging gas therefrom;
a pressurized gas canister attachable to the housing and having a sealed end disposed in fluid flow communication with the gas discharging means;
canister piercing means movably mounted in the housing for piercing the sealed end of the canister;
an electrical power source mounted within the housing;
water sensor means, mounted within the housing and extending partially outward therefrom, for generating an output signal when immersed in water;
force generating means, mounted in the housing, for driving the canister piercing means into the sealed end of the canister;

rotatable release means, mounted in the housing and rotatable between first and second positions, for blocking the force generating means from engaging the canister piercing means when the release means is in the first position and allowing the force generating means to forcibly engage the canister piercing means when the release means is in the second position; and

actuator means, mounted in the housing and connected to the electrical power source and the water sensor means, for rotating the release means from the first to the second position in response to an output signal from the water sensor means.

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**5,035,346**

**UNITED LIQUID-LEVEL AND PRESSURE REGULATOR FOR SEPARATORS**

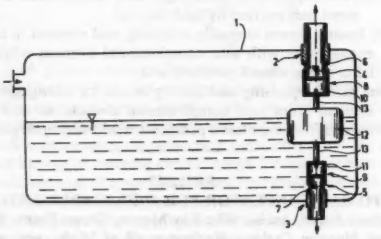
**Pintér Kálmán, Budapest, Hungary, assignor to Vegyimüveket Épitö és Szerelö Vállalat, Budapest, Hungary**

**Filed Jan. 23, 1989, Ser. No. 300,344**

**Claims priority, application Hungary, Mar. 10, 1988, 1146/88**

**Int. Cl.[5] B67D *5/08***

**U.S. Cl. 222—68** **5 Claims**



**1.** A combined liquid-level and pressure regulator for separators, comprising a liquid level sensing float connected through a rigid vertical shaft with two discharge cross-section controlling means, characterized in that said two discharge cross-section controlling means are pressure-compensated slide valves arranged so as to control respectively the discharge cross-sections of a gas outlet and a liquid outlet of the separator.

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**5,035,347**

**DEVICE FOR SQUEEZING TUBES CONTAINING A PASTE**

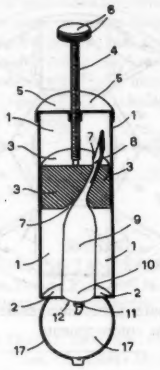
**Federico Trovò, P.O. Box 905, 35122 Padova, Italy**

**Filed Jan. 23, 1989, Ser. No. 300,567**

**Int. Cl.[5] B65D *35/30, 35/24, 35/56***

**U.S. Cl. 222—95** **1 Claim**

**1.** A device for the squeezing of tubes having one closed end and containing paste comprising a tubular casing in which slides a piston having the same cross-sectional shape as the tubular casing, said casing having an upper closure provided with a threaded central bore, said piston having spaced apart lower first and upper second surfaces and tranversed by a rectilinear shaped slit extending between said surfaces and having an insertion end formed in the shape of a curved asymmetrical funnel, whereby the closed end of a tube of paste can be inserted into the insertion end of the slit formed substantially in the center of the first surface, the paste in the tube being expelled be exerting manual pressure on said piston by means of a threaded rod connected coaxially to the second surface of the piston and being mounted in the upper closure bore of the casing closure, and the slit being arranged such that as said paste is expelled, said closed end of the tube protrudes from said second surface through an exit end of said slit offset from the center of the second surface of the piston, the paste exuding from an open end of the tube sitting on an aperture cut into a base of the casing, and said casing being fitted with an open, oblong window cut vertically into the casing, into which a finger or other object can be inserted to correct the position of the piston at the time of inserting the tube into the insertion



end of the slit or in the event of the malfunctioning of the device.

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**5,035,348**

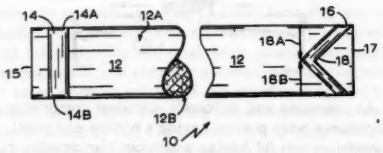
**CONTAINER HAVING A PRESSURE-RUPTURABLE SEAL FOR DISPENSING CONTENTS**

**Robert P. Seifert, Wolfeboro, N.H., assignor to Institute Guilfoyle, Belmont, Mass.**

**Filed Sep. 1, 1989, Ser. No. 402,084**

**Int. Cl.[5] B65D *47/10***

**U.S. Cl. 222—107** **7 Claims**



**1.** A fluid dispenser, the dispenser including a flexible vessel for containing a fluid, the vessel including

i. a top wall and a bottom wall, and

ii. means comprising a seal concentrating in a region thereof forces resulting from pressure generated in the fluid by applying a force to the vessel, said seal sealing the top wall to the bottom wall, said vessel being sufficiently strong that a weaker of the top wall or the bottom wall at the seal ruptures at the region of concentration in response to the applied force to form an opening through which the fluid is dispensed.

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**5,035,349**

**MULTI-COMPONENT STRIPING PASTE DISPENSER**

**Kenneth J. Donahue, West Chester, Pa., assignor to Betts Packaging Inc., Florence, Ky.**

**Filed Feb. 26, 1990, Ser. No. 484,519**

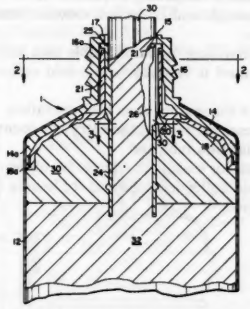
**Int. Cl.[5] B65D *35/08***

**U.S. Cl. 222—107** **5 Claims**

**1.** A dispenser for dispensing a paste-like material to provide the paste-like material with a striped effect, the dispenser including a striping assembly through which the paste-like material is dispensed, the striping assembly comprising:

(a) an outer shoulder member having a central aperture with a neck portion through which the striped paste-like material is dispensed, the neck portion including a flanged end portion outwardly of the interior of the dispenser;

(b) a tubular striping nozzle disposed within the neck portion of the shoulder member and having a flanged end portion for engaging the flanged end portion of the outer shoulder member to retain the striping nozzle within the said neck portion and a plurality of radial openings intermediate the ends thereof through which in use a paste-like material forming the stripes is dispensed; and



(c) a barrier member having a central aperture with a neck portion disposed within the shoulder member, the neck portion of the barrier member engaging the flanged end portion of the tubular striping nozzle thereby to retain the said flanged end portion of the tubular striping nozzle between the shoulder member and the barrier member.

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**5,035,350**

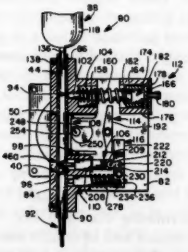
## METHOD AND APPARATUS FOR PRECISION SQUEEZE TUBE VALVING, PUMPING AND DISPENSING OF WORK FLUID(S)

**Russell E. Blette, West Chicago, and John O. Roeser, Barrington, both of Ill., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Division of Ser. No. 07/313,389, Feb. 21, 1989, Pat. No. 4,967,940. This application Aug. 22, 1990, Ser. No. 570,896**

**Int. Cl.[5] B65D** *37/00*

**U.S. Cl. 222—212** **3 Claims**



1. The method of precision positive shut off of a flowable work material from a source operable to cause the flowable work material to move through a dispensing outlet and having a flexible tube means intermediate the dispensing outlet and the source, said flexible tube means having an inlet end, an outlet end, an outlet movable surface and a compensator movable surface, each of said outlet movable surface and said compensator movable surface being operable for pinchingly engaging and disengaging said flexible tube means between the inlet end and outlet end, said compensator movable surface being larger than said outlet movable surface comprising the steps of:

a) with said compensator movable surface being in a partial pinching position, moving the outlet movable surface from a flow permitting position to a complete tube pinching position to prevent flow of material from said source and to prevent egress of work material in said tube means out said outlet end,

b) substantially simultaneous with step (a), moving said compensator movable surface in a direction opposite to the movement of outlet movable surface and a distance proportional to the relative sizes of said outlet movable surface and said compensator movable surface, and

c) moving said outlet movable surface from said complete tube pinching to prevent flow position to said flow permitting position while substantially simultaneously moving the compensator movable surface to its original partial tube pinching position whereby the volume of flowable work material in said tube means displacingly moved by outlet movable surface is offset by the tube internal volume change caused by movement of the compensator movable surface thereby preventing surge or suckback of work material through said outlet end when said outlet movable surface moves toward its pinching off of flow position or flow permitting position without ballooning of the tube means.

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**5,035,351**

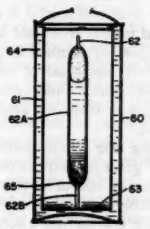
## METHOD AND APPARATUS FOR MAINTAINING A PRESSURE WITHIN A PRODUCT DISPENSER

**Michael J. Moran, Markham, Canada, assignor to CCL Industries Inc., Toronto, Canada**

**Filed Jan. 26, 1990, Ser. No. 470,911**

**Int. Cl.[5] B65D** *83/14, 83/60*

**U.S. Cl. 222—394** **29 Claims**



1. An apparatus for generating a pressure and substantially maintaining that pressure, comprising:

a first enclosure;

a first reactant disposed in said first enclosure;

a second enclosure, disposed within said first enclosure, comprising a walled structure including a permeable opening in one portion of said walled structure;

a liquid reactant disposed in said second enclosure; and

a first gas disposed in said second enclosure in an amount sufficient to overcome the surface tension of said liquid reactant at said permeable opening when the pressure within said second enclosure is not in substantial equilibrium with the pressure in said first enclosure surrounding said second enclosure, said liquid reactant being disposed between said first gas and said permeable opening;

wherein the size of said permeable opening is such that at a pressure equilibrium where a pressure within said second enclosure equals a pressure in said first enclosure surrounding said second enclosure, said liquid reactant does not substantially pass through said permeable opening into said first enclosure region.

**5,035,352**

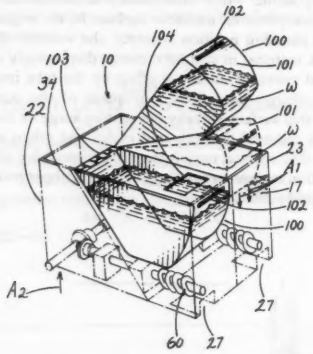
## ADJUSTABLE APPARATUS FOR SPREADING MORTAR AND METHOD THEREFOR

**Frank Mania, 12408 N. 29th Pl., Phoenix, Ariz. 85032**

**Continuation-in-part of Ser. No. 164,438, Mar. 4, 1988, abandoned. This application Jul. 25, 1989, Ser. No. 385,935**

**Int. Cl.[5] B05C** *5/00*

**U.S. Cl. 222—611.2** **7 Claims**




1. An adjustable apparatus for spreading mortar comprising:

hopper means including at least one opening for containing said mortar, said hopper means further including a first expansion means for accommodating a plurality of widths of masonry block building material, said first expansion means including opposed, detachable wall extending connecting members;

hinged lid means for covering said hopper means, said lid means including a tank member for containing water used for wetting said mortar, said tank member being in gravitational contact with said mortar in said hopper for aiding extrusion of said mortar from said hopper;

extrusion means operably coupled to said hopper means for extruding at least one bead of said mortar from said hopper means onto block building material, said extrusion means comprising at least one auger having auger shaft gears at one end;

drive means having axle pinion gears operably coupled to said auger shaft gears on said extrusion means for driving said extrusion means, said drive means comprising at least one wheel operably coupled to said at least one auger by means of an axle and having a second expansion means comprised of an axle adjustment sleeve coupled to said axle for accommodating a plurality of widths of masonry block building material;

trowel means for smoothing said bead extruded from said hopper, said trowel means being adjustably mounted above extrusion ports provided on said hopper means;

gate plate means for regulating amount of mortar being deposited onto said block building material; and

guide means positioned proximate to said extrusion means for positioning said apparatus and for directing said at least one bead of said mortar.

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**5,035,353**

## AUTOMATIC RIVETING MACHINE

**Charles F. Smart, Danbury, and Anthony D'Aquila, Trumbull, both of Conn., assignors to Emhart Inc., Newark, Del.**

**Continuation of Ser. No. 445,077, Dec. 1, 1989, Pat. No. 4,972,985. This application Oct. 16, 1990, Ser. No. 598,921**

**Int. Cl.[5] B21J** *15/10, 15/28*

**U.S. Cl. 227—2** **2 Claims**

1. A rivet setting machine comprising

a rivet tool,

a loading device for delivering a rivet to the rivet tool,

trigger means for operating said rivet tool to set a rivet, whereby a spent mandrel will be formed,

means for collecting the spent mandrel including

a conduit within said rivet tool,

a collection box and

a collection tube connecting said rivet tool conduit and said collection box, and

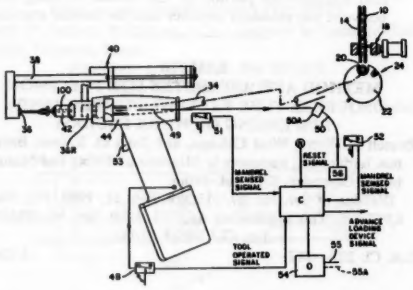
vacuum means for pulling a spent mandrel from said rivet tool, through said collection tube and into said collection box,

means for providing operator usable data indicating that a spent mandrel is blocked within said collection tube including

first means for sensing rivet tool operation,

second means for sensing the entry of a spent mandrel into said collection tube and

third means for sensing the departure of the spent mandrel from said collection tube and for issuing a sensed mandrel signal,




means for determining that said first and second sensing means have sensed tool operation and mandrel entry into said collection tube but that said third means has not sensed the departure of said mandrel from said collection tube within a predetermined period of time following the sensing of said spent mandrel by said second sensing means thereby determining the spent mandrel is blocked in said collection tube,

fault identification means operated when said determining means so determines that a spent mandrel is blocked in said collection tube for informing the operator of the fault and for preventing the actuation of said loading device, and

means for actuating said loading device in the event that the spent mandrel is sensed by said third sensing means following operation of said fault identification means including

a reset button for issuing a reset signal when operated and means for issuing an actuate loading device signal in the event said third sensing means has issued a sensed mandrel signal when said reset button issues said reset signal.

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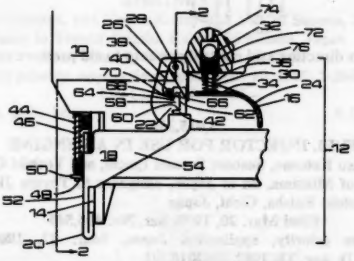
5,035,354

## SAFETY DUAL-INTERLOCK SYSTEM FOR FASTENER DRIVING TOOL

Robert J. Meyer, Elmwood Park, Ill., assignor to Duo-Fast Corporation, Franklin Park, Utah

Filed May 15, 1990, Ser. No. 523,704
Int. Cl.[5] B25L *1/04*
U.S. Cl. 227—7 7 Claims




1. A trigger and safety mechanism for a fastener driving tool having power means operable in a fastener driving stroke during which a fastener is driven into a workpiece, said trigger and safety mechanism comprising:

a manually operable safety member movable between a first safety position and a second safety position;

a manually operable trigger movable between a first trigger position and a second trigger position, said trigger being pivotably mounted on said fastener driving tool;

control means associated with said power means and said trigger for initiating a driving stroke upon the movement of said trigger from said first trigger position to said second trigger position;

safety interlock means having a safety interlock portion associated with said safety member and a trigger safety interlock portion, said trigger safety interlock portion including a rod transversely extending on an end of said trigger opposite to a finger actuating portion of said trigger and being associated with said trigger for preventing said safety member from moving from said first safety position to said second safety position unless said trigger is in said first trigger position; preventing said trigger from moving from said first trigger position to said second trigger position unless said safety member is in said second safety position; preventing said trigger from returning from said second trigger position to said first trigger position unless said safety member is in said second safety position; and preventing said safety member from returning from said second safety position to said first safety position whenever said trigger is in said second trigger position; and

a latch cavity included in said safety interlock means and disposed adjacent said rod, said latch cavity having a mouth portion formed between a depending lip portion and a bottom wall of said latch cavity and further having a rod retaining area formed by a cam surface of said lip portion, said rod being permitted to move into and out of said mouth of said latch cavity as said trigger pivots between said first and second trigger positions when said safety member is in said second safety position and being latched in said rod retaining area of said latch cavity when said trigger is in said second trigger position and said safety member is not in said second safety position.

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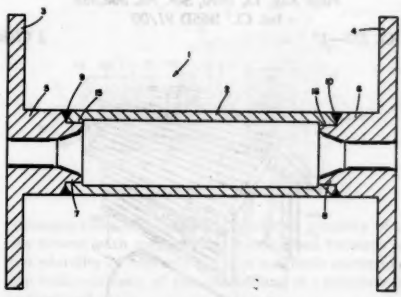
5,035,355

## METHOD FOR THE PRODUCTION OF A WARP BEAM, AND WARP BEAM SO PRODUCED

Rüdiger Dollhopf, Herbolzheim, Fed. Rep. of Germany, assignor to Rhone-Poulenc Rhodia Aktiengesellschaft, Freiburg, Fed. Rep. of Germany

Filed Sep. 7, 1989, Ser. No. 404,123
Claims priority, application Fed. Rep. of Germany, Dec. 7, 1988, 3841070
Int. Cl.[5] B23K *31/10*; B65H *75/14*
U.S. Cl. 228—104 2 Claims



1. A method for the production of a warp beam wherein the warp beam is subjected to an axial load test, said warp beam consisting of a round warp beam tube made of weldable metal and two beam flanges each having a flange neck and also made of weldable metal, wherein an end of the warp beam tube is provided at the inner circumference with an annular reinforcement or thickening fitted over a collar of a beam flange neck; the end of the beam tube is firmly connected with the flange neck by circumferential welding at the joint between the beam tube and the flange neck, the warp beam thus produced is relathed in the region of the flange necks, of the circumferential weld seams and of the beam tube, to final size; the warp beam is subjected to a load test by letting uniformly distributed tensile forces oriented in the direction of the longitudinal axis of the beam tube act on its cylindrical part, characterized by the fact that after the circumferential welding first only the immediate surrounding area of the circumferential weld seams (9; 10) lying in a region of beam tube-side heat action zones (11), over a length, measured from the center of the weld seam, which corresponds at most to the length of the annular reinforcement or thickening (15; 16) at the inner circumference of an end of the beam tube (2), further the region of the weld seams (9; 10) themselves and the immediate surrounding of the weld seams (9; 10) lying in the region of the beam flange necks (5; 6) are lathed down approximately to final size, thereafter the warp beam (1) is subjected to the load test under such conditions that the sum of the tensile forces oriented in the direction of the longitudinal axis of the beam tube (2):

a) is greater than the force necessary to reach the limit between the range of elastic and of plastic deformation of the metal in that part (14) of the wall of the beam tube (2) which is still within the beam tube-side heat action zones (11) but does not have an annular reinforcement or thickening at the inner circumference of an end of the beam tube (2), with reference to the warp beam (1) in the state relathed to final size,

b) is less than the force necessary to reach the limit between the range of elastic and plastic deformation of the metal in that part (13) of the wall of the beam tube (2) which too lies within the beam tube-side heat action zones (11) but had been lathed down previously, with reference to the warp beam (1) in a state not yet relathed to final size, and, only then the warp beam (1) is relathed to final size in the region of the beam flange necks (5; 6), of the weld seams (9; 10) and of the beam tube (2) under such conditions that

the thickness (s2) of the part (13) of the wall of the beam tube (2) now relathed, previously lathed down, and lying within the beam tube-side heat action zones (11) is greater than the thickness (s1) of the part (14) of the wall of the beam tube (2) now relathed but previously not lathed down and also lying within the beam tube-side heat action zones (11).

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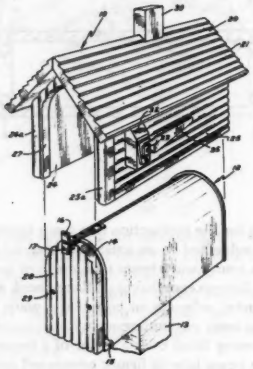
**5,035,356**

## MAILBOX COVER STRUCTURE

**Ray L. Granger, P.O. Box 416, Siren, Wis. 54872**

**Filed Aug. 13, 1990, Ser. No. 566,059**
**Int. Cl.[5] B65D *91/00***
**U.S. Cl. 232—17** **2 Claims**



1. A log cabin-like structure overlying an out of doors type of conventional mailbox, comprising

an open bottom shell substantially rectangular in plan,

spaced walls forming the sides of said shell, said walls being adapted to have their outer surface portions resemble logs,

a rear end wall not unlike said side walls in appearance,

a front end wall formed as a frame having its outward surface portion resembling a log structure,

a roof supported by said walls, said roof having an upper surface portion saw tooth in vertical section resembling planks,

an insert plate member to fit into said front end wall secured to a front cover of the underlying mailbox,

a block resembling a chimney atop said roof, and

a mail flag pivoted to one of said side walls,

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**5,035,357**

## PRESSURE CONTROL VALVE AND SYSTEM

**Joseph W. Brickell, and Steven W. Post, both of Jonesboro, Ark., assignors to FMC Corporation, Chicago, Ill.**

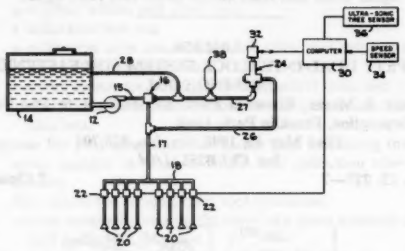
**Filed Feb. 14, 1990, Ser. No. 479,809**
**Int. Cl.[5] A01C *23/00***
**U.S. Cl. 239—156** **4 Claims**

1. A pressure control system for a sprayer having a manifold for supplying treatment liquid under a system pressure to a plurality of nozzle valves with means for independently opening and closing said plurality of valves; said system comprising:

a non-compensated pump for supplying treatment liquid to said manifold;

a pressure control valve interposed between said pump and said manifold and responsive to a control pressure to adjust the pressure in said manifold regardless of whether there is flow through said manifold;

a pilot valve means receiving said liquid at said manifold pressure and capable of reducing said manifold pressure to said control pressure as a function of the number of said plurality of nozzle valves which are open; and



means directing said control pressure to aid pressure control valve.

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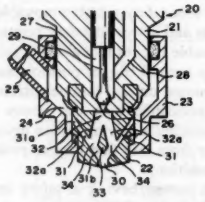
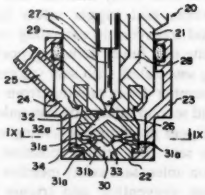
**5,035,358**

## FUEL INJECTOR FOR USE IN AN ENGINE

**Toshiyasu Katsuno, Susono; Satoshi Iguchi, and Yoshiki Chujo, both of Mishima, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Cichi, Japan**

**Filed Mar. 20, 1990, Ser. No. 496,549**
**Claims priority, application Japan, Mar. 22, 1989, 1-31395[U]; Apr. 12, 1989, 1-42016[U]**
**Int. Cl.[5] F02M *61/18, 69/00***
**U.S. Cl. 239—403** **13 Claims**





1. A fuel injector comprising:

a housing body;

a fuel supply bore for injecting fuel into an interior of said housing body;

a nozzle opening arranged on a common axis with said fuel supply bore and always open to an exterior of said housing body to inject both fuel and air into the exterior of said housing body;

an air passage filled with an air having a pressure higher than a pressure in the exterior of said housing body;

a joining portion formed in said housing body for joining the fuel injected from said fuel supply bore with the air fed from said air passage to cause the fuel to be carried by the air;

a fuel air passage formed in said housing body and extending between said joining portion and said nozzle opening to cause both the air and the fuel carried by the air to move toward said nozzle opening, said fuel air passage extend-

ing obliquely relative to an axis of said nozzle opening and comprising a pair of fuel air passages, with corresponding joining portions, symmetrically arranged with respect to said common fix and joined in said nozzle opening, the fuel injected from said fuel supply bore being fed into both said fuel air passages at said corresponding joining portions; and

an impingement wall formed by an inner circumferential wall of said nozzle opening, said fuel air passage extending toward said impingement wall to cause the air and fuel to impinge against said impingement wall.

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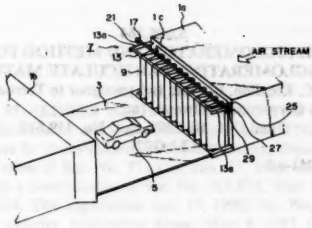
**5,035,359**

## DEVICE FOR CHANGING A DIRECTION OF AN AIRSTREAM

**Minoru Yamada, and Nobuo Kobayashi, both of Susono, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan**

**Filed Mar. 9, 1990, Ser. No. 491,155**
**Claims priority, application Japan, Mar. 10, 1989, 1-27714[U]**
**Int. Cl.[5] G01M** *9/00*
**U.S. Cl. 239—502** **6 Claims**




5. In a wind tunnel for testing an object in an airstream flowing from an air outlet, a device for changing a direction of flow of the airstream, said device comprising:

a plurality of spaced airstream direction control plates arranged in parallel in a plane extending perpendicularly to the direction of flow of the air steam; and

means for swinging said airstream direction control plates about respective swing axes extending along said plane by a predetermined angular degree from a position whereat said airstream direction control plates extend in parallel to the direction of flow of the air steam, said swing axes being positioned on the downstream side of said airstream direction control plates, respectively.

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**5,035,360**

## ELECTRICALLY ACTUATED GASEOUS FUEL TIMING AND METERING DEVICE

**Christopher J. Green, Don Mills, and James S. Wallace, Mississauga, both of Canada, assignors to The University of Toronto Innovations Foundation, Toronto, Canada**

**Filed Jul. 2, 1990, Ser. No. 546,749**
**Int. Cl.[5] F02M** *51/00, 21/02*
**U.S. Cl. 239—585** **5 Claims**

1. A device for timing and metering gaseous fuels, comprising:

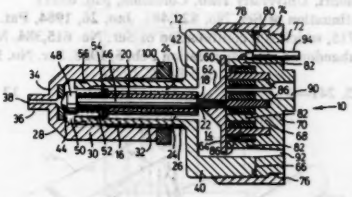
means defining a substantially cylindrical solenoid cavity open at one end of the cylindrical configuration, said means including a portion projecting away from the cavity in the direction opposite said one end, said portion having a bore coaxial with said cylindrical configuration, gas passageway means in said portion,

an injector tip secured to said portion in such a way that its position is adjustable longitudinally with respect to said bore, the injector tip defining an injector orifice, a valve seat upstream of said orifice and coaxial with said bore, and a chamber upstream of said valve seat, said chamber communicating with said cavity through said passageway means,

an elongate pintle snugly but slidably lodged within said bore, the pintle having at one end a closure head located within said chamber, the closure head being adapted to seat against said valve seat to close said orifice,

resilient means for urging said closure head against said valve seat to close said orifice,

an electrically actuated multipole solenoid including a base constituting a cap for closing the open end of said cavity, a first plurality of spaced-apart, unwound cap ribs projecting into the cavity from the base and being in magnetic



communication with said base, a second plurality of cap ribs wound with magnet wire interspersed between said first plurality of ribs and being in magnetic communication with said base, all ribs terminating at a common first surface, and

an armature of ferromagnetic material for the solenoid, said armature being secured to the other end of said pintle and defining a second surface complementary to said first surface, the pintle having a length such that, when the head is seated against said valve seat the armature is spaced from said ribs, and when the armature is seated against said ribs the head is off said valve seat, thus opening said orifice.

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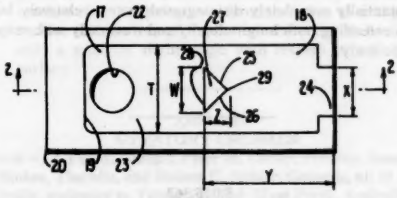
**5,035,361**

## FLUID DISPERSAL DEVICE AND METHOD

**Ronald D. Stouffer, Silver Spring, Md., assignor to Bowles Fluidics Corporation, Columbia, Md.**

**Continuation-in-part of Ser. No. 845,117, Oct. 25, 1977, Pat. No. 4,151,955. This application Oct. 19, 1978, Ser. No. 952,910**
**The portion of the term of this patent subsequent to May 1, 1996, has been disclaimed.**
**Int. Cl.[5] B05B** *1/08;* **F15B** *21/12;* **F15C** *1/08, 1/22*
**U.S. Cl. 239—589.1** **3 Claims**



1. A device for spraying fluid, comprising:

a body member having a chamber defined therein, said chamber having inlet and outlet openings;

means for applying fluid under pressure to said inlet opening;

sweep means in said chamber for causing fluid to issue from said chamber in the form of a sheet which is cyclically swept back and forth in a direction transverse to the flow direction of said sheet, said sweep means comprising means for forming vortices in the fluid flowing through said chamber, which vortices act on said fluid to tend to cause it to issue from said chamber in the manner of a swept sheet, whereby said swept sheet breaks up into

small particles which are dispersed over a two-dimensional area when impinging upon a target disposed in the flow path of said swept sheet.

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**5,035,362**

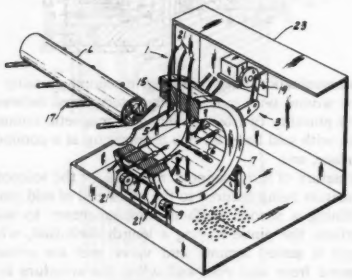
**DISINTEGRATION OF WOOD**

**Marian Mazurkiewicz, c/o The Curators of the University of Missouri, University Hall, Columbia, Mo. 65211**

**Continuation of Ser. No. 822,481, Jan. 26, 1984, Pat. No. 4,723,715, which is a continuation of Ser. No. 615,384, May 30, 1984, abandoned. This application Feb. 5, 1988, Ser. No. 152,893**

**Int. Cl.[5] B02C *19/18***

**U.S. Cl. 241—1** **12 Claims**



1. The method of reducing a body of organic material having longitudinal and transverse dimensions to a multiplicity of organic particles, said method comprising subjecting the body to liquid jet means comprising at least one substantially coherent continuous stream of liquid at a delivery pressure of from about 4,000 psi to about 60,000 psi, and effecting relative movement of said jet means and the body so that the liquid as it impacts on the body traverses a path on the body at a relatively low velocity of less than about fifteen feet per minute whereby the energy of the liquid as it impacts on the body is sufficiently concentrated and of sufficient duration to effect disintegration of the body into said multiplicity of particles, said traversal path followed by the impacting liquid comprising a plurality of closely spaced reaches disposed over at least a substantial portion of the outer surface of the body whereby the body is substantially completely disintegrated over a relatively large area extending both longitudinally and traversely with respect to the body.

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**5,035,363**

**ULTRASONIC GRINDING OF EXPLOSIVES**

**Carlos Somoza, Minden, La., assignor to Thiokol Corporation, Ogden, Utah**

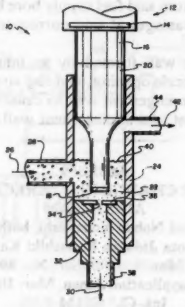
**Filed Jul. 6, 1990, Ser. No. 549,449**

**Int. Cl.[5] B02C *19/00***

**U.S. Cl. 241—1** **10 Claims**

1. A method for reducing the particle size of particulate explosive material, comprising:

adding said particulate explosive material to an inert liquid to form a slurry thereof; subjecting said slurrry to treatment proximate an ultrasonic generator wherein acoustic cavitation in said inert liquid abrades and grinds said particulate explosive material to a reduced particle size, without detonation thereof; and



separating said particulate explosive material of reduced particle size from said inert liquid.

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**5,035,364**

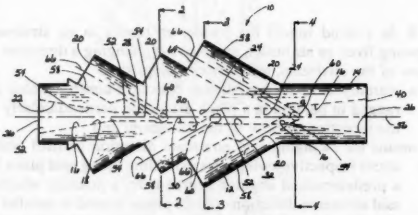
**DEAGGLOMERATOR AND METHOD FOR DEAGGLOMERATING PARTICULATE MATERIAL**

**Eduardo C. Escallon, Elwood, Ind., assignor to Terronics Development Corporation, Elwood, Ind.**

**Filed Oct. 10, 1989, Ser. No. 419,510**

**Int. Cl.[5] G02C *19/06***

**U.S. Cl. 241—5** **40 Claims**



1. A deagglomerator comprising a body, said body having an inlet port and an outlet port and a central passage extending therethrough connecting said inlet and outlet ports, said central passage having a wall and a longitudinal axis, a plurality of injection passages, a plurality of inlet ports and tangential outlet ports, said injection passages connecting said inlet and outlet ports, respectively, said injection passages being aligned within said body such that said injection outlet ports intersect said central passage, said injection passages and outlet ports being aligned within said body to inject fluid into fluid flowing through said central passage with a flow component which is transverse to said longitudinal axis to produce a vortex flow adjacent to said wall.

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**5,035,365**

**THORTVEITITE ORE BENEFICIATION PROCESS**

**Scott D. Birmingham, Platteville, Colo., assignor to Boulder Scientific Company, Mead, Colo.**

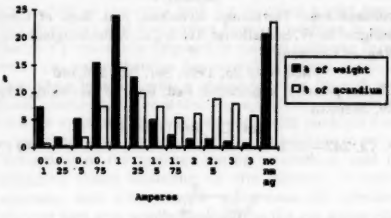
**Filed Feb. 15, 1990, Ser. No. 480,534**

**Int. Cl.[5] B02C *23/08***

**U.S. Cl. 241—14** **13 Claims**

1. A thortveitite ore beneficiation process which comprises (i) comminuting said ore to substantially liberate the thortveitite contained therein

(ii) passing said comminuted ore through a nonuniform magnetic field to produce a concentrate and a tailing said




concentrate containing a substantially greater percentage of thortveitite than said ore.

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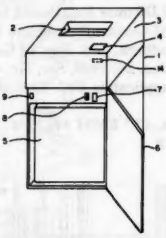
**5,035,366**

## PAPER SHREDDER WITH SERVICE POWER OUTLET

**Minoru Hashimoto, and Haruyoshi Migita, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Continuation of Ser. No. 372,128, Jun. 27, 1989, abandoned, which is a continuation of Ser. No. 163,532, Mar. 3, 1988, abandoned. This application Apr. 17, 1990, Ser. No. 511,977**
**Claims priority, application Japan, Mar. 9, 1987, 62-34248**
**Int. Cl.[5] B02C *25/00***
**U.S. Cl. 241—36** **2 Claims**



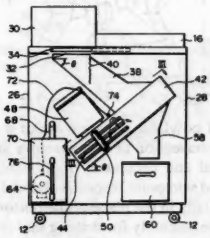

1. A shredder comprising
a cutter means for shredding paper,
driver means for driving said cutter means,
power outlet means for supplying power to external electrical equipment,
a power source for supplying power,
a display means for displaying operating conditions of said shredder,
a first switching means for selectably allowing and disallowing power from said power source to be supplied therethrough to said driver means and to said display means,
a second switching means for selectably allowing and disallowing power from said power source to be supplied therethrough to said driver means irrespective of whether or not power from said power source is being supplied to said display means, and
an openable cover door means covering said first and second switching means, said second switching means being controlled by the closing and opening of said openable cover door means.

**5,035,367**

## APPARATUS FOR DISPOSING OF MEDICAL WASTE BY CRUSHING

**Norihiro Nojima, Tokyo, Japan, assignor to Nojima Keikinzoku Co., Ltd., Higashimurayama and Kaneto Co., Ltd., Kaminoyama, both of, Japan**

**Filed Feb. 12, 1990, Ser. No. 478,574**
**Claims priority, application Japan, Feb. 15, 1989, 1-16472[U]; May 16, 1989, 1-56358[U]; Dec. 8, 1989, 1-320048**
**Int. Cl.[5] B02C *19/14***
**U.S. Cl. 241—37.5** **19 Claims**




1. Apparatus for reducing medical waste comprising:
(a) a housing defining an interior space and a top opening in the housing communicating with said interior space for receiving waste,
(b) means for conveying the waste generally horizontally toward one side of the housing interior space,
(c) said interior space defining a crusher chamber, said chamber having top and bottom parallel walls and an arcuate side wall,
(d) at least two sets of rotor blades in said chamber and means for rotating said blades on an axis oriented perpendicular said parallel walls, said rotor blade sets being arranged in at least two axially spaced sets,
(e) stator blades cooperating with said rotor blades and comprising circumaxially spaced blocks secured to said arcuate wall,
(f) said interior space further including a discharge passageway communicating with an opening in said arcuate wall of said crusher chamber to receive the crushed waste and to direct the crushed waste into a removable receptacle provided in the housing adjacent the bottom wall of the housing,
(g) said means for conveying the waste material horizontally toward one side of the housing interior space includes an inclined guide surface oriented at approximately 60 degrees with respect to the horizontal, said top wall of said crusher chamber being so oriented relative to said guide surface that the axis of rotation of said rotor blades forms only a small or slight angle with respect to said guide surface.

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**5,035,368**

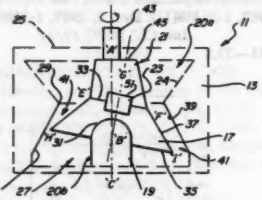
## GYRATORY CRUSHER

**David A. J. Finley, Craigie; Peter M. Carley, Myaree; James R. Stokes, Thornlie, and Robert C. Napier, Gosnells, all of Australia, assignors to Yalata Pty Ltd, West Perth, Australia**

**PCT No. PCT/AU88/00228, § 371 Date Feb. 9, 1990, § 102(e) Date Feb. 9, 1990, PCT Pub. No. WO89/00455, PCT Pub. Date Jan. 26, 1989**
**PCT Filed Jun. 30, 1988, Ser. No. 459,759**
**Claims priority, application Australia, Jul. 9, 1987, PI3021**
**Int. Cl.[5] B02C *2/00***
**U.S. Cl. 241—212** **19 Claims**

1. Apparatus for crushing frangible and friable material comprising, in combination, a bowl having an inner circumferential wall defining a chamber for receiving said material, said chamber having a central axis and terminating in a throat defining a central discharge opening, a crushing head disposed

generally centrally within said chamber and rotatable about a gyratory axis, said head having a crushing face in spaced relation to said inner circumferential wall, said head and body defining an annular nip between said wall and said crushing face, a support assembly supporting said crushing head with its gyratory axis positioned at an acute angle relative to the central axis of said bowl for gyration about a fixed pivot point defined at the intersection of said gyratory and central axes to permit rotational and oscillatory motion of said head about gyratory axis and said point respectively, said pivot point being located substantially in the plane of the bottom of said crushing head, and a drive assembly for driving said crushing head with a gyratory movement within said bowl chamber.



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**5,035,369**

**SYSTEM FOR WINDING A CONE OF YARN OR THE LIKE**

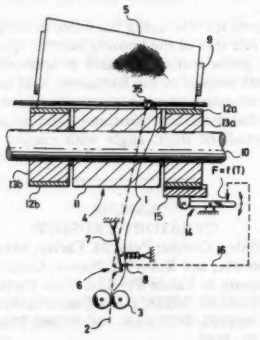
**Jaroslav Beran, Liberec; Miloš Pavlů, Liberec; Vladimír Prášil, Liberec; Zdeněk Holý, Liberec; František Pešek, Ústí nad Orlicí; Zdeněk Vitámvás, Liberec, and Josef Vítěk, Liberec, all of Czechoslovakia, assignors to Elitex koncern textilního strojírenství, Czechoslovakia**

Filed May 24, 1989, Ser. No. 356,428

Claims priority, application Czechoslovakia, May 25, 1988, 3531-88; Jun. 8, 1988, 3958-88

Int. Cl.[5] B65H *54/42, 54/46, 59/38*

U.S. Cl. 242—18 DD 11 Claims



1. A system for winding filamentary material around a cone, said system comprising:

a drive ring for rotating the cone;

a lateral ring for supporting the cone, said lateral ring being rotatable with respect to said drive ring; and

controlling means for controlling the angular velocity of the cone by sensing the tension of the filamentary material and controlling the rotation of said lateral ring in response to the tension of the filamentary material.

**5,035,370**

**METHOD AND APPARATUS FOR AVOIDING RIBBON WINDINGS WHEN WINDING A CROSS-WOUND BOBBIN**

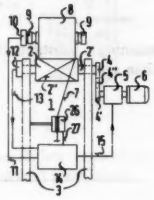
**Ferdinand-Josef Hermanns, Erkelenz, Fed. Rep. of Germany, assignor to W. Schlafhorst AG & Co., Mönchengladbach, Fed. Rep. of Germany**

Filed May 23, 1990, Ser. No. 528,140

Claims priority, application Fed. Rep. of Germany, May 24, 1989, 3916918

Int. Cl.[5] B65H *54/38*

U.S. Cl. 242—18.1 19 Claims



1. Method for avoiding ribbon windings when winding a cross-wound bobbin or cheese being driven by a drive drum having reversing thread grooves for yarn guidance and a drive mechanism having a course of motion, which comprises continuously varying the circumferential speed of the drive drum; accelerating and decelerating the cheese exclusively with the drive drum; accelerating and braking the drive drum with the drive mechanism of the drive drum in accordance with a predeterminable periodic function; and rotating the cheese with a course of motion following the course of motion of the drive drum in a permanently phase-displaced manner.

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**5,035,371**

**APPARATUS FOR STABILIZING A YARN PACKAGE TUBE DURING YARN UNWINDING**

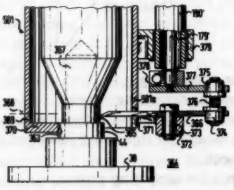
**Hans Grecksch, and Dietmar Engelhardt, both of Monchengladbach, Fed. Rep. of Germany, assignors to W. Schlafhorst & Co., Moenchengladbach, Fed. Rep. of Germany**

Filed Dec. 26, 1989, Ser. No. 456,384

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1988, 3843553

Int. Cl.[5] B65H *54/20, 67/02*

U.S. Cl. 242—35.5 R 7 Claims



1. In a textile machine of the type having a plurality of independently movable tube support members for individually supporting tubes in generally upright dispositions, an unwinding device for unwinding, at an unwinding location, packages of textile material such as yarn or the like which is wound on tubes supported on the tube support members, a delivery assembly for delivering the tube support members to a preliminary location for feeding to the unwinding device, a discharge assembly for transporting tube support members from a discharge location to a further handling location, a cross-transport assembly for transporting the tube support members along a cross path extending from the preliminary location through the unwinding location to the discharge location and a yarn end loosening apparatus at the unwinding location

having a pair of independently movable chamber portions, the chamber portions being pivotally mounted by a pivot member adjacent the cross path, and means for pivoting each chamber portion between a clearance position in which the chamber portion is clear of the cross path for travel of a tube support member therepast and a chamber forming position in which the chamber portions are disposed in contact with one another to form a gas guide chamber for encircling a yarn package at the unwinding location with a lateral opening formed in the gas guide chamber, a tube stabilizing apparatus, comprising:

means for engaging the tube of a supported package during unwinding of textile material from the package to prevent movement of the package during unwinding, said tube engaging means including an arm member, a member opposing said arm member and means for selectively moving said arm member relative to the gas guide chamber through the lateral opening thereof into contact with the tube of a yarn package at the unwinding location to thereby apply a force against the tube in a lateral direction toward said opposing member with said opposing member engaging a selected one of the tube and the tube support member opposite said lateral direction for stabilizing the tube between said arm member and said opposed member to minimize lateral movement of the tube.

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**5,035,372**

## WINDING DEVICE FOR A YARN, IN PARTICULAR FOR A YARN WITH APPROXIMATELY ZERO ELONGATION

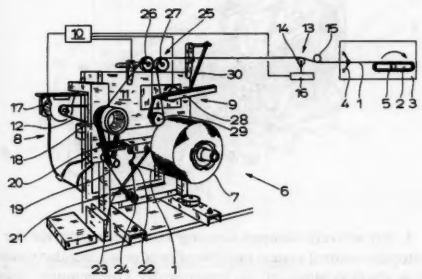
**Peter Siebertz, Wesel, Fed. Rep. of Germany, assignor to Georg Sahm GmbH & Co. KG, Fed. Rep. of Germany**

**Filed Jan. 5, 1990, Ser. No. 461,283**

**Claims priority, application Fed. Rep. of Germany, Feb. 3, 1989, 3903214**

**Int. Cl.[5] B65H** *59/38, 51/30*

**U.S. Cl. 242—45** **14 Claims**



1. A winding device for winding yarns upon a take-up foundation, and in particular inelastic yarns comprising:

mounting means for mounting a take-up foundation;

a rotary drive for rotating a take-up foundation mounted upon said mounting means;

a supply of yarn and means for unwinding yarn from said supply;

speed detection means for detecting yarn speed just upstream from the take-up foundation and for producing a corresponding speed signal;

yarn tension regulator means for regulating yarn tension, said regulator means being positioned just downstream of the means for unwinding and including a spatially displaceable guide element, said guide element having a set point position;

a measured value detector means for producing a position signal as a function the position of the guide element relative to said set point position, and

an electronic control unit, said control unit receiving the speed signal from said speed detection means and the position signal from the measured value detector means, and outputting a corresponding control signal for controlling the unwinding speed of said means for unwinding as a function of the speed signal and so as to return said guide element to said set point position.

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**5,035,373**

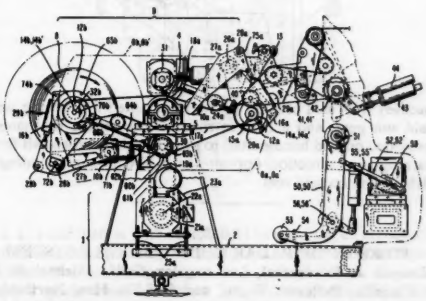
## CONSTANT CONTACT LAY-ON ROLL WINDER

**Michael C. Perrigo, Staten Island, N.Y., assignor to John Brown, Inc., Warwick, Conn.**

**Filed Apr. 8, 1986, Ser. No. 882,966**

**Int. Cl.[5] B65H** *19/20*

**U.S. Cl. 242—56 A** **5 Claims**



1. An improved turret winding device comprising turret arms, and core chucks mounted on the turret arms, in which the improvement is comprised of:

a. a float roll;

b. one or more float arms upon which said float roll is rotatably mounted;

c. a float arm pivot upon which said float arms are rotatably mounted;

d. tensioning means which are attached to said float arms to provide tension in a web of film being fed into said turret winder;

e. a float arm movement sensor which is capable of detecting the displacement of said float arms;

f. a core chuck speed control which varies core chuck rotational speed in response to the displacement of said float arms;

g. a web feed drive;

h. one or more feed rolls, which are driven by said web feed drive at line speed;

i. a bowed roll; and

j. an adjustable clutch drive which drives said bowed roll in response to said web feed drive.

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**5,035,374**

## DRAG DEVICE FOR FISHING REELS

**Kyoichi Kaneko, Tokyo, Japan, assignor to Daiwa Seiko Inc., Tokyo, Japan**

**Filed Jul. 18, 1989, Ser. No. 381,342**

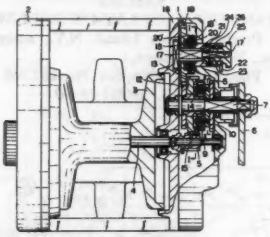
**Claims priority, application Japan, Aug. 19, 1988, 63-206151; Dec. 9, 1988, 63-311477; Dec. 9, 1988, 63-311478**

**Int. Cl.[5] A01K** *89/015*

**U.S. Cl. 242—264** **11 Claims**

1. A drag device for double bearing type fishing reels, comprising side plates on the reel, a handle shaft supported on said plates of the reel so that said handle shaft is turned by a handle and turns a spool on a spool shaft, a spool shaft-turning pinion on said spool shaft, a driving gear meshed with said spool shaft-turning pinion, a sun gear which is rotatably fitted around said handle shaft so that said driving gear is turned with said handle shaft, a support member having planetary gears supported rotatably thereon, and said support member mounted on said handle shaft so that said support member is turned unitarily therewith, an internal gear formed on an inner circumferential portion of said driving gear with said planetary

gears being meshed with said sun gear and said internal gear, a braking gear supported on said side plates of said reel, plate means to generate a braking force against said braking gear, a regulating knob pressing against said plate means, a gear



meshed with said braking gear and mounted for turning with said sun gear, and a reverse rotation preventing mechanism provided on said handle shaft to prevent said handle shaft from turning in a direction opposite to a direction of winding a fishing line on said reel.

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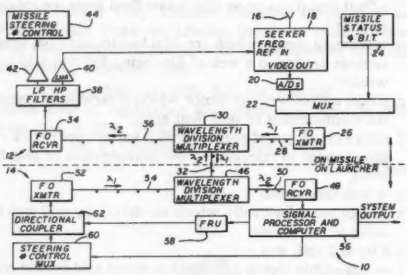
**5,035,375**

## FIBER OPTIC RADAR GUIDED MISSILE SYSTEM

**Kenneth J. Friedenthal, Los Angeles, Calif.; Michael de La Chapelle, Bellevue, Wash., and Hui-Pin Hsu, Northridge, Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Dec. 19, 1988, Ser. No. 286,436**
**Int. Cl.[5] F41G 7/32**
**U.S. Cl. 244—3.12** **7 Claims**




1. A fiber optic radar guided missile system comprising:

a missile;

a base; and,

fiber optic link means for communicating a first optical signal through an optical fiber extending between said missile and said base while simultaneously communicating a second optical signal through said optical fiber between said base and said missile;

said missile including:

a radar transmitter for transmitting radar signals to a target to provide reflected radar signals, means for receiving reflected radar signals to provide said first optical signal, and transmitter means for transmitting said first optical signal over said fiber optic link means to said base:

said base including:

base receptor means for receiving said first optical signal to provide a first electrical signal, and base processor means for processing said first electrical signal to provide frequency reference information;

a frequency reference unit for receiving said frequency reference information to provide a frequency reference signal;

multiplexer means for providing steering and control adjustment signals and coupler means for combining said frequency reference signal and said steering and control adjustment signals into a combined reference and steering and control signal;

a fiber optic transmitter means for receiving said combined reference and steering and control signal and generating a second optical signal for communication over said fiber optic link means to said missile;

said missile further including:

missile receptor means for receiving said second optical signal to provide a second electrical signal, missile processor means for processing said second electrical to recover said frequency reference signal, and means for coupling said recovered frequency reference signal to said radar transmitter.

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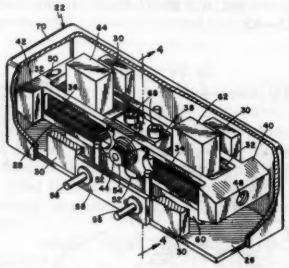
**5,035,376**

## ACTIVELY DAMPED STEERING RATE SENSOR FOR ROTATING AIRFRAME AUTOPILOT

**Allan A. Voigt, Anaheim; Kenneth C. York, Pomona, and John M. Speicher, Upland, all of Calif., assignors to General Dynamics Corp., Pomona Division MZ 1-25, Pomona, Calif.**

**Filed Jul. 31, 1981, Ser. No. 282,834**
**Int. Cl.[5] F41G 7/00; G01P 9/02**
**U.S. Cl. 244—3.21** **16 Claims**



1. An actively damped steering rate sensing device for an autopilot control system capable of producing angular rotation in a control plane of an intentionally continuously axially rolling airframe in response to a rotation related guidance command signal, the sensing device comprising:

an elongated armature member;

means for mounting the armature member to the airframe for pivotal movement about an axis extending through the armature member intermediate its length, the pivot axis being oriented with respect to the rotational axis of the airframe so that the armature member will pivot by gyroscopic precession in response to rotation in the control plane of the rolling airframe;

a sensing coil mounted on one end of the armature member;

a damping coil mounted on the other end of the armature member;

first magnetic means adjacent the one end of the armature member for causing an output signal to be induced in the sensing coil upon pivotal movement of the armature member; and

second magnetic means adjacent the other end of the armature member for causing pivotal movement of the armature member to be inhibited upon application of a damping signal to the damping coil.

5,035,377

## FREE STANDING OR AIRCRAFT LIFT GENERATOR

Benno E. Buchelt, Maria Saal, Austria, assignor to Technolizenz Establishment, Triesen, Liechtenstein

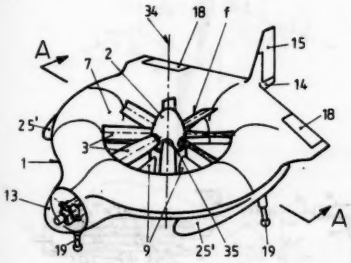
Continuation-in-part of Ser. No. 10,360, Feb. 3, 1987, Pat. No. 4,796,836, which is a continuation of Ser. No. 804,799, Feb. 28, 1986, abandoned. This application Sep. 20, 1988, Ser. No. 247,111

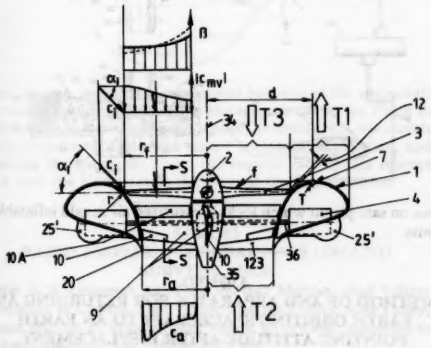
Claims priority, application Austria, Feb. 28, 1985, 600/85

The portion of the term of this patent subsequent to Jan. 10, 2006, has been disclaimed.

Int. Cl.[5] B64C *27/02, 29/02*

U.S. Cl. 244—12.1 20 Claims




1. An aircraft lift generator, comprising:

an axial fan rotatable about a fan axis and having a hub centered on said axis and a plurality of radially extending blades of airfoil cross section with blade tips remote from said axis at respective ends of said blades;

a convexly curved inlet fairing rotationally symmetrical about said axis, shrouding said fan and surrounding same so as to define a clearance from said tips of less then 1/25 of a diameter of said fan measured diametrically to said tips; and

means connected with said fan for rotating same about said axis to induce airflow through said fairing from an inlet side thereof to an outlet side thereof,

said blades having twists radially outwardly from said hub such that a mean blade angle $\beta_m$ defined as an angle of inclination between the airfoil chord line of each blade and a plane of the direction of the peripheral velocity of the blade perpendicular to said axis at a radial location 0.5 l of the radial length l between said hub and said tip is in a ratio $\beta_m/d\beta_1$- of at least 3.8 where $d\beta_1$ is a maximum difference between the blade angles at distances of 0.25 l on opposite radial sides of said location delimiting a median radial range of the respective blade.

5,035,378

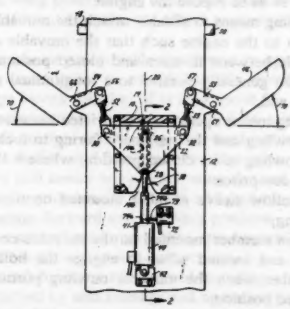
## VARIABLE ALIGNMENT MECHANISM

Joseph P. Spanovich, 521 Snipes Dr., St. Charles, Mo. 63303

Filed May 7, 1990, Ser. No. 522,219

Int. Cl.[5] B64C *3/038;* F16H *21/044*

U.S. Cl. 244—49 6 Claims



1. In combination with the support structure of an aerospace vehicle having a plurality of deployable aerosurfaces, an alignment mechanism, comprising:

(a) a guide means having a longitudinally extending slot which comprises a constant width portion and a variable width portion;

(b) a slide means having an engaging means integrally attached thereto such that said slide means is capable of translational movement along said slot through the action of said engaging means travelling within said slot;

(c) a rod means pivotally connected to said slide such that said slide means is capable of pivotal movement when said engaging means travels within said variable width portion of said slot, but wherein said slide means is incapable of pivotal movement when said engaging means travels within said constant width portion of said slot;

(d) means for interconnecting said slide means and said deployable aerosurfaces; and

(e) an actuator means operably connected to said rod means for selectively positioning said slide means along said slot of said guide means.

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5,035,379

## MOVABLE AIRCRAFT ENGINE COWLING

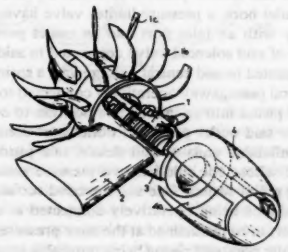
René M. J. Hersen, Combs la Ville, and Pascal-Marie P. M. Soulter, Le Havre, both of France, assignors to Societe Anonyme Dite Hispano-Suiza, Saint-Cloud, France

Filed Apr. 5, 1990, Ser. No. 504,869

Claims priority, application France, Apr. 5, 1989, 89 04456

Int. Cl.[5] B64D *29/06*

U.S. Cl. 244—129.4 5 Claims



1. A cowling for an aircraft engine attached to the aircraft via a pylon mounting structure comprising:

(a) a stationary fairing portion;

(b) a movable cowling portion defining a slot, movable between a closed position wherein the stationary fairing is disposed in the slot such that the engine is enclosed by the movable cowling portion and the stationary fairing, and an open position wherein the movable cowling portion is displaced away from the stationary fairing portion and the engine so as to expose the engine;

(c) attaching means to slidably attach the movable cowling portion to the engine such that the movable cowling is movable between its open and closed positions along a direction generally parallel to a longitudinal axis of the engine and,

(d) locking means operatively associated between the movable cowling and the stationary fairing to lock the movable cowling in its closed position, wherein the locking means comprises:

(i) a hollow sleeve member mounted on the stationary fairing;

(ii) a pin member mounted on the movable cowling portion and located so as to engage the hollow sleeve member when the movable cowling portion is in its closed position;

(iii) a ring member located on the movable cowling portion; and,

(iv) a hook member mounted on the stationary fairing and located so as to engage the ring member when the movable cowling portion is in its closed position.

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**5,035,380**

**DE-ICER**

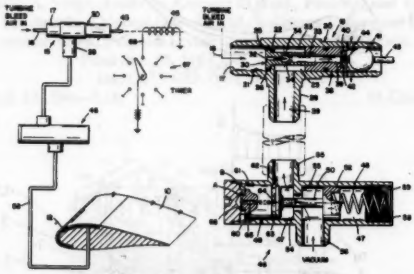
**Norbert A. Weisend, Jr., Cuyahoga Falls, and Paul G. Tritt, Norton, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio**

**Filed Jan. 9, 1990, Ser. No. 462,207**

**Int. Cl.[5] B64D *15/00***

**U.S. Cl. 244—134 A** **9 Claims**

6. A system for controlling the inflation and deflation of inflatable units of a deicer, comprising inflatable units that are operative on flexing to break up ice accumulated thereon, a solenoid operated valve with an inlet bore and a pair of outlet bores, a pressure source of unregulated air connected to said inlet bore, said solenoid operated valve having a central passageway with a slidable spool valve therein, said spool valve operative between a first position and a second position, a solenoid operated rod operative to move said spool valve between said first and said second position, said control valve having said passageway for receiving pressurized air from said pressure source when said spool valve is in said second position, said spool valve in said first position operative to direct pressurized air to one of said outlet bores, said spool valve operative in said second position to create a pull a vacuum in said one outlet bore, a pressure limiter valve having a central passageway with an inlet port and an outlet port, said one outlet bore of said solenoid valve connected to said inlet port, a piston mounted in said central passageway, a spring mounted in said central passageway operatively connected to said piston to bias said piston into an inoperative position to connect said inlet port to said outlet port, said outlet port communicating with said inflatable units of said deicer, said piston having a piston head whose one side has two pressure areas, said two areas being a first surface face and a second surface face, said first surface face being operatively connected at all times to said inlet port to be maintained at the same pressure or vacuum as on said inlet port, said piston being moveable to an operative position to block the connection between said inlet port and said outlet port, said piston movable into said operative position in response to a pressure build up on said first surface face from said inlet port that is equal to or greater than said spring



bias on said piston which locks pressurized air in said inflatable units.

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**5,035,381**

**METHOD OF AND APPARATUS FOR RETURNING AN EARTH ORBITING SPACECRAFT TO AN EARTH POINTING ATTITUDE AFTER DISPLACEMENT THEREFROM**

**Nicholas Matthews, Plainsboro, N.J., assignor to British Aerospace Public Limited Company, London, England**

**Filed Mar. 31, 1989, Ser. No. 331,322**

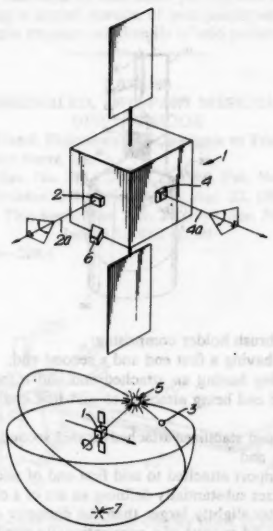
**Claims priority, application United Kingdom, Apr. 20, 1988, 8809247**

**Int. Cl.[5] B64G *01/24*; F41G *07/00***

**U.S. Cl. 244—164** **15 Claims**

1. A method of returning an Earth orbiting spacecraft to an Earth pointing attitude after displacement therefrom, utilizing apparatus on the spacecraft which includes an Earth sensor which has a boresight, at least one Sun sensor having a boresight offset from the Earth sensor boresight, a star sensor having a boresight substantially at right angles to the Sun sensor boresight for sensing the position of a predetermined reference star, actuator means operable in response to the sensors to change the spacecraft attitude and an angular momentum storage device which has an angular momentum storage axis in a direction having an angle in the range of 30 to 150 degrees to the Sun sensor boresight and aligned with a principle axis of the spacecraft, which method includes the steps of maintaining the spacecraft in an attitude in which the Sun is on the Sun sensor boresight, rotating the spacecraft around a Sun sensor-Sun line until the predetermined reference star enters

the view of the star sensor, operating the angular momentum storage device to accumulate angular momentum sufficient to preserve an attitude reference, further rotating the spacecraft around the Sun sensor-Sun line by an angle $\alpha$ computed from astronomical tables in dependence upon the time of day and




time of year, such that a subsequent rotation of the spacecraft around the angular momentum storage axis causes the Earth to enter the view of the Earth sensor, releasing the spacecraft from alignment of the Sun sensor boresight on the Sun, and rotating the spacecraft about the angular momentum storage axis until the Earth enters the view of the Earth sensor.

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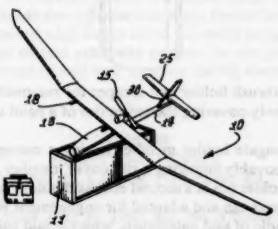
**5,035,382**

## RAPID ASSEMBLY AIRCRAFT FOR GROUND SURVEILLANCE

**Peter B. S. Lissaman, Altadena; W. Ray Morgan, Simi Valley; Martyn B. Cowley, Simi Valley; Charles J. Sink, Simi Valley, and William D. Watson, Simi Valley, all of Calif., assignors to Aerovironment, Inc., Monrovia, Calif.**

**Filed Apr. 17, 1989, Ser. No. 339,090**
**Int. Cl.[5] B64C *13/20***
**U.S. Cl. 244—190** **26 Claims**




**1. In a manually launchable aircraft adapted to be assembled from components that fit closely together in a package substantially shorter than the wing span of the aircraft, the combination comprising**

**a) a fuselage having a relatively enlarged forward portion and a relatively reduced size rearward portion, with vertical stabilizer area, the aircraft having a principal axis which extends forwardly through the fuselage, and a yaw axis which extends normal to the principal axis and upwardly and downwardly relative to the fuselage, the principal axis and yaw axis defining an intersection locus,**

**b) a propeller, electric motor drive therefor, and electric battery means for energizing the motor, all carried by said fuselage forward portion,**

**c) a center wing panel having removable attachment to said fuselage forward portion to extend transversely relative thereto,**

**d) wing tips having removable attachment to opposite ends of said center panel to extend laterally therefrom, said wing tips having dihedral of at least about 5°,**

**e) and horizontal tail structure attached to said fuselage rearward portion, said fuselage rearward portion removably attached to said fuselage forward portion,**

**f) whereby said center wing panel, wing tips and tail structure may be individually fitted in said package, alongside said fuselage forward and rearward portions,**

**g) at least one of said removable attachments including interfittable pin and socket connections,**

**h) the aircraft having a rudder, and including a rate gyroscope carried by said fuselage and operatively connected with the rudder for controlling same, the gyroscope located at said locus and having an axis of sensitivity extending upwardly and tilted forwardly from said locus and relative to said yaw axis at an angle between 10° and 50° relative thereto to be responsive to both yaw and roll of the aircraft about said yaw axis and said principal axis, respectively, for controlling the rudder to counteract both yaw and roll, which are both controlled by the rudder.**

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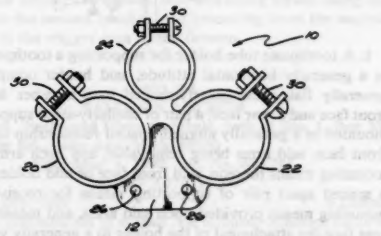
**5,035,383**

## SPACE SAVER SERVICE CLAMP

**Gilles A. Rainville, Northridge, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.**

**Continuation of Ser. No. 311,262, Feb. 16, 1989, abandoned. This application Dec. 4, 1989, Ser. No. 445,141**
**Int. Cl.[5] F16L *3/00***
**U.S. Cl. 248—68.1** **11 Claims**



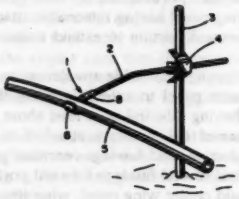

**1. A space saving operating system service conduit clamp comprising a triangular array of three resilient, circular strap elements and a base plate, each of said strap elements being configured to provide positive restraint for a single operating system service conduit, one of such strap elements being nested in a volume between portions of the other two such elements of said triangular array, said strap elements in said array being unitary with one another and with said base plate, and said base plate having attachment means for coupling said clamp to structure associated with said operating system.**

5,035,384

## SUPPORT CLIP AND METHOD OF USE

Paul E. Werthmann, 530 Alyce La., Aurora, Ill. 60505

Filed Jun. 21, 1989, Ser. No. 369,608
Int. Cl.[5] F16B 7/00
U.S. Cl. 248—74.2 3 Claims



1. A combination for guiding a moving construction device comprising a construction ground stake, a stringline rod adjustably clamped to the ground stake, a flexible tube for guiding the moving construction device, and a clip supporting the construction guide tube on the stringline rod with the clip having a curved saddle shaped in the form of an approximate semi-circle and sized to receive and retain the tube and also having a tubular socket integrally attached to the saddle with the socket having a bore sized to receive an inserted end of the stringline rod.

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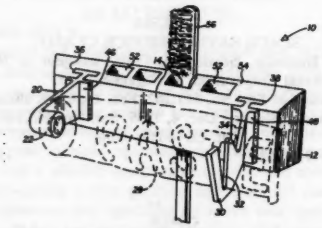
5,035,385

## CLOSURE MEANS AND HOLDER FOR TOOTHPASTE TUBE

Brandon L. Markham, 1149 Stillwell Rd., Belle Glade, Fla. 33430

Filed Feb. 28, 1990, Ser. No. 486,411
Int. Cl.[5] B65D 35/00
U.S. Cl. 248—108 11 Claims



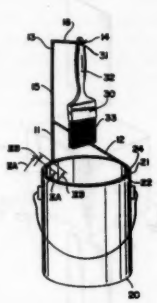
1. A toothpaste tube holder for supporting a toothpaste tube in a generally horizontal attitude, said holder comprising a generally flat, rectangularly-shaped base member having a front face and a rear face, a pair of similarly-sized support arms mounted in a generally aligned, spaced relationship upon said front face, said arms being removable, and each arm having mounting means thereon, said front face of said holder having a spaced apart pair of supporting means for receiving said mounting means provided upon said arms, and means on said rear face for attachment of the holder to a generally vertically disposed supporting surface, one of said arms having a fixedly attached cap thereon, and the other arm having thereon a tube receiving means, said cap having a tapered interior, configured to receive the nozzle from which toothpaste is dispensed from the toothpaste tube, such that upon the user discarding the original cap of the toothpaste tube, the cap of said one arm can serve as the closure for the nozzle, as well as the support for that end of the toothpaste tube, whereas said receiving means of said other arm of said holder serves to receive and support the closed end of the toothpaste tube.

5,035,386

## PAINTBRUSH HOLDER

Francis C. Tucker, 200 Summit Ave., Mingo Junction, Ohio 43938

Filed Sep. 20, 1990, Ser. No. 585,677
Int. Cl.[5] A46B 17/02
U.S. Cl. 248—110 18 Claims



1. A paintbrush holder comprising:
a first leg having a first end and a second end;
a second leg having an attached end and a free end, said attached end being attached to said first end of said first leg;
an arc-shaped stabilizer attached to said second end of said first leg; and
a brush support attached to said first end of said first leg,
said stabilizer substantially defining an arc of a circle having a diameter slightly larger than the diameter of the outer wall of a lid groove of a conventionally-sized paint can.

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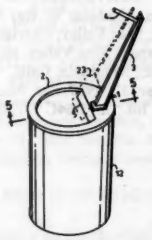
5,035,387

## PAINTBRUSH HOLDER AND SCRAPER

Eugene A. Gizzi, 2701 SW. 13th Ave., Fort Lauderdale, Fla. 33315

Filed Aug. 17, 1990, Ser. No. 568,788
Int. Cl.[5] A46B 17/02
U.S. Cl. 248—110 6 Claims



1. A paintbrush holder and scraper for removably engaging and completely covering the entire rim of a paint can comprising:
(a) an elongate holder member having a connecting means for removably engaging a rim cover member at a first end and a holder pin at a second end, said holder pin supported above said can and adapted for engagement with a hole in the handle of said paintbrush, wherein said paintbrush will drain into said can when so engaged;
(b) a rim cover member bearing a flat paintbrush scraper or wiper element so arranged to wipe excess paint off said paintbrush and to drain paint into said can, said rim cover member having a plurality of rim locking means for removably engaging the rim of said paint can, said rim cover member having an outer portion defining a complete

circle for covering said rim in its entirety when so engaged to thereby prevent paint from contaminating said rim when in use, and said rim cover member provided with engaging means for removably engaging said connecting means to support said holder member at a fixed angle above said rim, said scraper element being completely encircled by said outer portion and arranged for engaging a lateral portion of said paintbrush when said holder pin engages said handle of said paintbrush.

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**5,035,388**

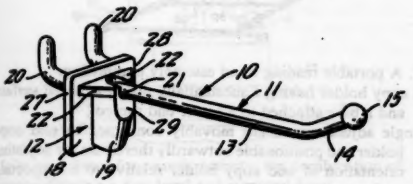
## PRE-ASSEMBLED, TWO-PART MERCHANDISE DISPLAY HOOK

**Thomas O. Nagel, Blairstown, N.J., assignor to Trion Industries Inc., Wilkes-Barre, Pa.**

**Division of Ser. No. 216,123, Jul. 7, 1988, Pat. No. 4,984,356, which is a division of Ser. No. 41,854, Apr. 22, 1987, Pat. No. 4,785,511. This application Apr. 24, 1990, Ser. No. 513,568**

**Int. Cl.[5] A47B *96/06***

**U.S. Cl. 248—220.4** **5 Claims**




1. In a two-part merchandise display hook of the type comprising a shaped wire hook element having a downwardly extending hook-mounting portion and an outwardly extending merchandise support portion, and a one-piece molded plastic base member of the type having a forwardly projecting body provided with an upwardly opening socket for the snug reception of said hook-mounting wire portion and a pair of rearwardly projecting L-shaped mounting lugs, the improvement in said molded plastic base member characterized by

(a) said base member including a flat, panel-like portion of generally rectangular configuration,

(b) said forwardly projecting body extending forwardly from the front face of said panel-like portion,

(c) said body being recessed from the top, bottom and side edges of said panel-like portion, whereby to provide unobstructed edge margins around the entire periphery of the front face of said panel-like portion,

(d) said L-shaped mounting lugs extending rearward from the back face of said panel-like portion,

(e) said mounting lugs joining said panel-like portion adjacent to but spaced below the upper edge thereof and spaced inside the opposite side edges thereof to provide an unobstructed edge flange about the entire periphery of the back face of said panel-like portion for the guidance and confinement of said base member during assembly operations.

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**5,035,389**

## MOUNTING DEVICE

**Shu-San Wang, No. 83, Lane 29, Hua-Cheng Rd., Hsinchuang City, Taiwan**

**Filed Aug. 20, 1990, Ser. No. 570,055**

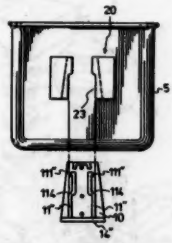
**Int. Cl.[5] F16N *13/00***

**U.S. Cl. 248—224.1** **11 Claims**

1. A mounting device mounted on a receptacle, comprising:

a trapezoidal plate having a tapered top edge and a bottom edge, a pair of ribs extending from said bottom edge toward said tapered top edge, each of said ribs including a first portion and a second portion, said second portion being resilient and seperated from said trapezoidal plate and each of said second portions having an engaging member formed at one end thereof;

an attached body attached to said receptacle and having a pair of attaching members, each having an edge facing the other, each of said attaching members having a channel




along said edge adjacent a planar face of said receptacle which is adapted to let said trapezoidal plate slide in and to sandwich said plate between said channels while said engaging members of said second portions engage a top of said edges of the attaching members.

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**5,035,390**

## ADAPTER FOR ATTACHING AN ANIMAL CALL TO A FIREARM

**Joseph Sanders, Box 1100 Davidson Ave., Elrama, Pa. 15038**

**Filed Apr. 11, 1990, Ser. No. 507,864**

**Int. Cl.[5] A01M *31/00***

**U.S. Cl. 248—231** **17 Claims**

1. An adapter for attaching an animal call to a firearm with a trigger area comprising: (a) a first bracket that is capable of being attached to the firearm: (b) a second bracket, connected to the first bracket, said second bracket being capable of holding an animal call means; and (c) an activating means for activating the animal call means, said activating means being attached to the second bracket, and extending from the second bracket to the trigger area of the firearm.

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**5,035,391**

## BALLOON ANCHOR

**Dennis M. Steele, and Diana C. Steele, both of Rte. 1, Box 25, Nofsger Rd., Lake Ann, Mich. 49650**

**Filed Mar. 1, 1990, Ser. No. 486,744**

**Int. Cl.[5] A47B *91/00***

**U.S. Cl. 248—346** **6 Claims**

1. The combination of at least one inflated, tethered, decorative party balloon and anchor means therefor; the improvement therewith comprising:

said anchor means being a weight member having a bracket secured to and vertically extending therefrom,

said bracket including an open peripheral rim portion and at least one vertical appendage extending from said weight member and normally disposed within the confines of said open peripheral rim,

said at least one vertical appendage having a base portion secured to said weight member and a terminus spaced from said open peripheral rim portion of said bracket,

said peripheral rim and said terminus of said at least one vertical appendage being normally disposed in a common vertical plane and being relatively separable along a portion of the plane to permit the insertion and frictional retention of a card member therebetween, and

said peripheral rim serving as a connection structure for attaching at least one inflated, tethered, decorative party balloon to said weight member.

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**5,035,392**

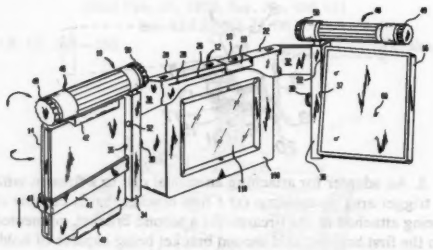
**VIDEO TERMINAL ACCESSORY**

**Clifford Gross, Roslyn, and Patricia Cooper, Great Neck, both of N.Y., assignors to Biomechanics Corporation of America, Melville, N.Y.**

**Filed Sep. 24, 1990, Ser. No. 586,691**

**Int. Cl.[5] B41J *11/00***

**U.S. Cl. 248—422.2** **6 Claims**



1. A video terminal accessory for holding materials used in conjunction with a video terminal, comprising:

attachment means for removably attaching said accessory to said video terminal,

at least one display board for holding said materials adjacent to said video terminal,

a hinge connecting said display board to said attachment means, said display board being pivotable about said hinge and thereby being movable relative to said video terminal,

lighting means mounted on said display board for illuminating said materials held by said display board, said lighting means including light sensing means for sensing the level of illumination on said board and automatic adjustment means for automatically adjusting the intensity of light from said lighting means in response to said light sensing means to maintain a predetermined level of illumination on said display board,

wherein said attachment means is adjustable for fitment onto various sized video terminals,

wherein said attachment means includes first and second shoulder portions for fitment over corners of said video terminal, said first shoulder portion being movable along a longitudinal axis relative to said second shoulder portion, and

wherein said video terminal accessory further comprises a vertical post, said display board being attached to said hinge via said post, said lighting means being mounted on said vertical post.

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**5,035,393**

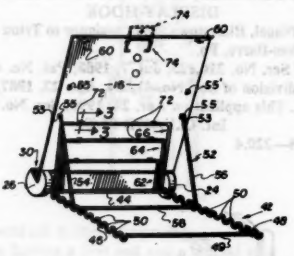
**PORTABLE, COLLAPSIBLE READING STAND WITH ADJUSTMENT MEANS**

**David L. Mensaged, 12260 SW. 40th St., Miami, Fla. 33175**

**Filed Mar. 12, 1990, Ser. No. 492,881**

**Int. Cl.[5] A47G *1/24***

**U.S. Cl. 248—456** **9 Claims**



1. A portable reading stand assembly comprising:

a copy holder having a substantially planar exposed surface and a base attached to a lower end thereof,

angle adjustment means movably connected to said copy holder and positionable outwardly therefrom for adjusting orientation of said copy holder relative to a supporting surface on which said base is disposed,

said angle adjustment means comprising a first arm including a plurality of receiving notches formed along a length thereof and a second arm movably connected to said copy holder and positionable into supported engagement along the length of said first arm, both said first arm and aid second arm being pivotally attached to said copy holder and movable between said collapsed position and an operative position,

said collapsed position defined by a folded, substantially parallel orientation of said first and second arms relative to and adjacent a rear surface of said copy holder,

said operative position defined by an outwardly extending orientation of said first arm in supported engagement with the supporting surface and an outer end of said second arm removably mounted in the plurality of receiving notches along the length of said first arm,

height adjustment means including at least one extension arm pivotally mounted to said copy holder and movable so as to extend outwardly from beneath said base and into supported engagement with the supporting surface for adjustment of the height of said copy holder above the supporting surface,

said base including a copy support portion disposed at the lower end of the copy holder in outwardly extending relation to said exposed surface thereof and in supporting relation to a copy disposed on said exposed surface,

retaining means connected to said support portion for retaining the copy in place thereon and including a flexible material pad having a gripping assembly including a plurality of spaced apart projections extending outwardly from an outer surface thereof and into engagement with a lower edge of the copy, said pad being removably attached in overlying relation to said support portion and including at least one connecting finger extending outwardly from an under surface thereof through receiving apertures formed in said supporting, and

handle means movably mounted on the rear surface of the copy holder and selectively disposed between a stored and a carrying position.

5,035,394

## ISOLATOR FOR SEISMIC ACTIVITY

Wayne R. Haak, Malibu, Calif., assignor to The J. Paul Getty Trust, Los Angeles, Calif.

Filed Oct. 9, 1990, Ser. No. 593,994
Int. Cl.[5] F16M *13/00*; E04B *1/36*; E04H *9/06*
U.S. Cl. 298—562 13 Claims

1. In an isolator for seismic activity, the combination of:

means defining a first level and a second level,

with said levels including interengaging means for providing relative movement and interconnection between said levels along an axis, said interengaging means including: a centering and restoring means having

a lever pivotally attached to one of said levels adjacent one end of said lever and with roller means carried adjacent the other end of said lever;

guide means attached to the other of said levels and having a guide face oblique to said axis; and

spring means for urging said lever roller means against said guide face.

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5,035,395

## SUPPORT CRADLE FOR LOAD EQUALIZATION

Brock R. Settlemier, Piedmont; Steven R. Bone, Walnut Creek; John Tolivaisa, Pacifica, and James E. Nugent, Walnut Creek, all of Calif., assignors to Bigge Crane and Rigging Co., San Leandro, Calif.

Filed Dec. 15, 1989, Ser. No. 451,217
Int. Cl.[5] F16M *13/00*
U.S. Cl. 248—634 5 Claims

1. A support cradle for load equalization including

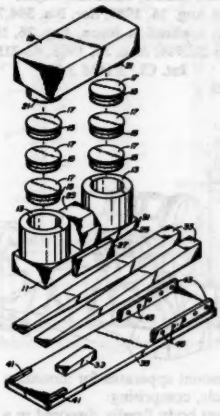
a lower base member having a pair of cylindrical cribs secured thereto,

multiple layers of fabreeka secured to metal plate separators and disposed in said cribs and having the lateral edges thereof constrained by said crib when said material is put under compression,

a load bearing upper member having a pair of cylindrical pistons secured thereto formed for fitting into said crib in closely fitting relation for bearing on said fabreeka layers,

safety blocks formed for preventing excessive loading of the fabreeka by limiting penetration of the pistons on the upper load bearing member into the cribs formed on the lower base member, and

wedge means for lifting said cradle vertically including a tapered surface on the bottom surface of said base member



and guide means disposed at the edges thereof proximate the center of the base member.

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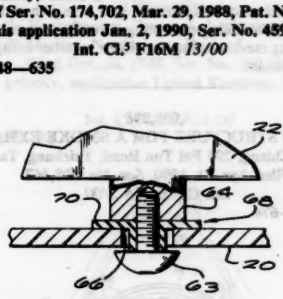
5,035,396

## DISK DRIVE UNIT

Richard G. Krum, Thousand Oaks, and Neil E. Bucknam, Simi Valley, both of Calif., assignors to Seagate Technology, Inc., Scotts Valley, Calif.

Division of Ser. No. 174,702, Mar. 29, 1988, Pat. No. 4,908,715.
This application Jan. 2, 1990, Ser. No. 459,442
Int. Cl.[5] F16M *13/00*
U.S. Cl. 248—635 5 Claims




1. A mounting arrangement for mounting a circuit board to a disk drive housing, comprising:

a plurality of ports formed in said circuit board;

a plurality of fastener receiving boss members on said disk drive housing;

a plurality of fasteners passed respectively through said circuit board ports and fastened to said boss members, at least some of said ports in said circuit board being oversized to permit lateral shift of the circuit board generally in the plane of the circuit board relative to said disk drive housing to allow for thermal expansion and contraction of the circuit board; and

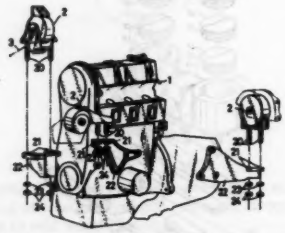
a plurality of spacer bushings seated within said oversized ports for passage therethrough of the associated fasteners, said spacer bushings providing means for spacing said boss members and said fasteners from said circuit board.

5,035,397

## ENGINE MOUNT APPARATUS

Taiji Yamada, Hamamatsu, Japan, assignor to Suzuki Jidosha Kogyo Kabushiki Kaisha, Shizuoka, Japan

Filed Aug. 16, 1989, Ser. No. 394,756
Claims priority, application Japan, Aug. 26, 1988, 63-211985; Aug. 26, 1988, 63-211986; Aug. 30, 1988, 63-215977
Int. Cl.[5] F16M *3/00*
U.S. Cl. 248—638 8 Claims



1. An engine mount apparatus for mounting an engine on a chassis of a vehicle, comprising:

an engine mount body fixedly disposed in a predetermined position on the chassis and having a stud bolt mounted thereon and extending substantially vertically downwardly therefrom;

a bracket having an upwardly facing through hole for receiving said stud bolt therethrough, said bracket being secured to said engine; and

a nut threadingly engaged with said stud bolt inserted through said through hole;

whereby in the mounting of said engine it is lifted up vertically, said engine mounted body and said bracket are fitted with each other so that said stud bolt extends through said through hole, and said nut is then tightened on said stud bolt from beneath said chassis, thereby mounting said engine on said chassis;

said engine mount body comprising an auxiliary bracket having said stud bolt thereon and being threadingly engaged with a shaft penetrating a resilient member, and a supporting member of said resilient member being secured to said chassis.

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5,035,398

## MOUNTING STRUCTURE FOR A SMOKE EXHAUSTER

Chao-Cheng Chiang, 293 Pei Tun Road, Taichung, Taiwan

Filed Apr. 11, 1990, Ser. No. 508,367
Int. Cl.[5] F16M *5/00*
U.S. Cl. 248—674 3 Claims

1. Mounting structure for a smoke exhauster comprising a housing having at least an exhaust vent, a smoke outlet, on its inner top surface axially corresponding to said smoke outlet a retaining plate, comprising a receiving opening and a plurality of retaining holes, lug guides and rest surfaces for defining as the connection of a fan motor to said retaining plate, a plurality of connection means thereof;

said fan motor including a motor having thereunder provided a central shaft connecting to a centrifugal fan, extending horizontally and outwardly from its top circumference a plurality of locking lugs;

each said locking lug being located about its top circumference at equi-angular intervals and composed of a locking hole near its front edge and a pair of positioning lips on its either side;

said retaining plate, having in its flat bottom center a receiving opening for permitting said motor passing therethrough, oppositely from said receiving opening an upwardly displaced welding rim for defining the connection of said retaining plate and said housing, on the edge of said receiving opening and in a similar arrangement as said locking lugs a plurality of lug guides for permitting said locking lugs passing therethrough, on the edge of said receiving opening and respectively next to said lug guides a plurality of rest surfaces, between the edge of each said receiving opening and the other edge away from thereon a retaining hole being provided in alignment with each said locking hole, between the bottom of said retaining plate and said upwardly displaced welding rim a receiving cavity being formed for permitting the adjusting of the alignment of said locking holes and said retaining holes by the clockwise and anticlockwise rotations of said motor when said locking lugs are placed therein.

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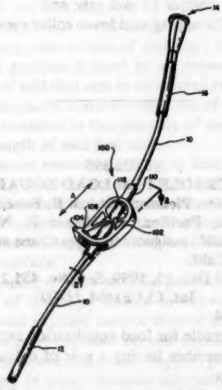
5,035,399

## PROTECTIVE TUBING CLAMP APPARATUS

Ann M. Rantanen-Lee, Sandy, Utah, assignor to C.R. Bard, Inc., Murray Hill, N.J.

Filed May 25, 1990, Ser. No. 529,221
Int. Cl.[5] F16L *55/14*
U.S. Cl. 251—10 28 Claims



1. An apparatus for occluding resilient tubing to interrupt the flow of a fluid therethrough, the apparatus comprising:

(a) means for compressing the resilient tubing by urging together opposing walls thereof, the means for compressing being capable of assuming an open and a closed configuration and having compressing structures adapted to produce mutually opposed forced for urging together opposing walls of the resilient tubing when the means for compressing is in the closed configuration;

(b) means for protectively covering at least a portion of the circumference of the resilient tubing with a layer of resil-

ient material, the means for protectively covering being positionable at any one of a plurality of positions along the length of the resilient tubing; and

(c) means for permanently connecting the means for compressing to the means for protectively covering, such that the means for protectively covering is interposed between the resilient tubing and the compressing structure whenever the means for compressing is in its closed configuration in any of said plurality of positions along the length of the tubing, thereby minimizing damage to any particular position on the resilient tubing due to the repeated compressing of the resilient tubing by the means for compressing.

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**5,035,400**

## STAPLE REMOVAL TOOL

**Paul J. Altenbach, Jr., 106 Main St., Glendon, Easton, Pa. 18042**

**Filed Feb. 21, 1990, Ser. No. 483,147**
**Int. Cl.[5] B25C *11/00***
**U.S. Cl. 254—28** **4 Claims**

1. A tool for the removal of a staple employed for attachment of a cable to a support structure without damaging the cable, the staple including a pair of generally parallel spaced legs extending at least partially into the support structure on both lateral sides of the cable, the legs being interconnected by a crown which spans the cable and secures the cable to the support structure, the tool comprising:

a head member having generally parallel spaced lateral sides and including a pair of outwardly extending, generally parallel flat plates spaced apart a distance which is less than the distance between the legs of the staple and which is greater than the lateral width of the cable, each of the flat plates being secured to a lateral side of the head member such that the plane of each plate is generally parallel to the plane of the lateral side to which it is secured, a workpiece engaging surface being located on each plate perpendicular to the plane of each plate for engaging the crown of the staple between the legs and between the crown and the support structure, the plates include a support structure engaging surface which is generally curved; and

a handle member for engaging the head member in a manner such that the application of a force upon the handle member causes the flat plates to exert a force upon the crown of the staple to move the crown away from the support structure and to remove the legs of the staple from the support structure.

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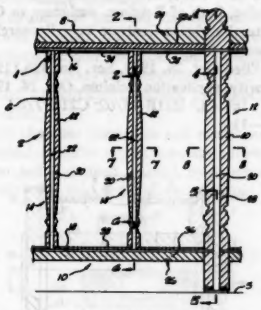
**5,035,401**

## WOOD RAILING WITH METAL FOUNDATION

**Frederick H. Solter, 419 Mark Dr., Simi Valley, Calif. 93065**

**Filed Jan. 14, 1987, Ser. No. 3,128**
**Int. Cl.[5] E04H *17/14***
**U.S. Cl. 256—19** **6 Claims**

1. A railing or divider comprising an upper metal rail member, a lower metal member, metal balusters extending between and affixed to said upper and lower metal rail members, and wooden members mounted on said metal members and configured to surround same, wherein said upper metal rail member



is surrounded by a grooved wooden handrail mounted above said metal rail member and a wooden strip mounted below said rail member.

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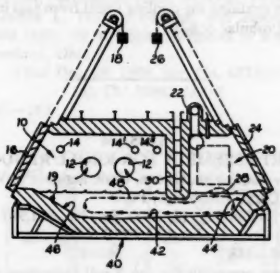
**5,035,402**

## FURNACES

**Adrianus J. Hengelmolen, Dreumel, Netherlands, assignor to Copermill Limited, Nottingham, England**

**Filed Oct. 20, 1988, Ser. No. 260,399**
**Claims priority, application United Kingdom, Oct. 24, 1987, 8724944**
**Int. Cl.[5] C21D *11/00***
**U.S. Cl. 266—88** **10 Claims**



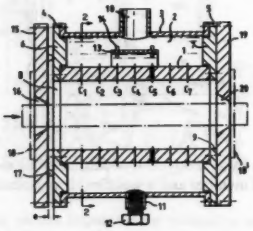
1. An improved closed well furnace for melting aluminium scrap into molten metal, the furnace comprising a main heating chamber and a closed well melting chamber having a common floor with a refractory dividing wall separating the main heating chamber and the closed well chamber, the improvement comprising sloping the floor of the well in a downward direction from the melting chamber to the main heating chamber to assist the flow of molten liquid within the furnace.

5,035,403

## APPARATUS FOR COOLING A CYLINDRICAL MEMBER IN LINEAR MOTION

Jean-Francois L. Noville, Herstal, and Stéphan H. Wilmotte, Chaudfontaine, both of Belgium, assignors to Centre de Recherches Metallurgiques-Centrum Voor Research in de Metallurgie, Brussels, Belgium

Filed Oct. 24, 1989, Ser. No. 426,119
Claims priority, application Belgium, Oct. 24, 1988, 08801224
Int. Cl.[5] B21B *45/02*; C21D *1/62*
U.S. Cl. 266—114 17 Claims



1. Apparatus for cooling a cylindrical member in linear motion by means of a cooling agent, comprising:

a straight tubular conduit open at both ends and through which the cylindrical member is to be passed;

an envelope means surrounding said tubular conduit in spaced relationship and forming an annular chamber between said tubular conduit and said envelope means;

an upstream end and a downstream end for said chamber with respect to the direction of travel of the cylindrical member;

an upstream wall and a downstream wall closing said upstream end and said downstream end respectively;

means for introducing cooling agent into said annular chamber;

a plurality of substantially straight passages through said tubular conduit providing communication between said annular chamber and the internal space of said tubular conduit, said passages being located substantially in planes perpendicular to and axially spaced along the longitudinal axis of said tubular conduit, said passages being equally spaced circumferentially in each of said planes forming axially spaced rings of passages in said tubular conduit, each said ring of passages having an displacement with respect to a neighboring ring; and

means for draining the cooling agent from said internal space of said tubular conduit.

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5,035,404

## RETORT ASSEMBLY FOR KROLL REDUCTIONS

Hani A. M. Abodishish, Ogden, Utah, assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 13, 1990, Ser. No. 581,947
Int. Cl.[5] F27B *5/05*
U.S. Cl. 266—148 8 Claims

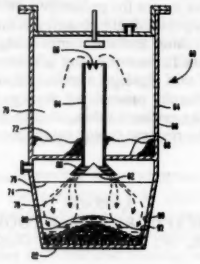
1. A retort assembly for the Kroll reduction of a metallic chloride by a reducing metal, comprising:

a retort defining a first chamber for containing a metallic chloride;

a crucible having a generally vertical sidewall, the crucible generally defining a second chamber for containing a reducing metal and the reduction products;

a vapor passageway extending from an inlet in the first chamber to an outlet in the second chamber;

a diffusion means in the second chamber adjacent the outlet of the vapor passageway having a surface extending outwardly of and downwardly away from the passageway for diffusing vapor toward the sidewall of the crucible.



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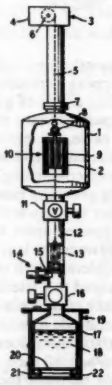
5,035,405

## APPARATUS FOR ANNEALING AND QUENCHING

Wolfgang Reuter, Niddatal, Fed. Rep. of Germany, assignor to Leybold Aktiengesellschaft, Fed. Rep. of Germany

Division of Ser. No. 377,133, Jul. 10, 1989, Pat. No. 4,992,112.
This application Aug. 14, 1990, Ser. No. 566,764
Claims priority, application Fed. Rep. of Germany, Dec. 30, 1988, 3844272
Int. Cl.[5] C21D *9/00*
U.S. Cl. 266—250 12 Claims



1. An annealing and quenching apparatus for annealing a charge in a vacuum or protective atmosphere annealing system and for subsequently quenching the charge in a quenching system, the charge being moved by a conveyor system from the annealing system to the quenching system, the apparatus comprising: a first chamber having a means for heating the charge; a sluice chamber for at least intermediate storage of the charge, said sluice chamber located below said first chamber; a quenching container, said quenching container located below said sluice chamber; a first sluice valve connecting said first chamber to said sluice chamber; a second sluice valve connecting said sluice chamber to said quenching container; a gripper element on the conveyor system for releasable holding the charge in the first chamber and in the sluice chamber; wherein in a method for using the apparatus the charge is lowered into the first chamber by the conveyor system and heated therein; wherein the charge is moved by the conveyor system through the first sluice valve and into the sluice chamber, and positioned therein; wherein the gripper element is retracted from

the sluice chamber through the first sluice valve after the charge is released; wherein after closing the first sluice valve to close the first chamber relative to the sluice chamber, the second sluice valve is open, thereby quenching the charge.

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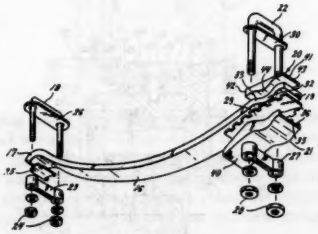
5,035,406

## VARIABLE RATE SECONDARY SPRING FOR A PRIMARY LEAF SUSPENSION SPRING

**Roger G. Sellers, Fenton, and George R. Schmidt, St. Louis, both of Mo., assignors to Moog Automotive, Inc., St. Louis, Mo.**

**Filed Mar. 9, 1989, Ser. No. 321,181**
**Int. Cl.[5] F16F 1/22**
**U.S. Cl. 267—48** **4 Claims**



1. In a spring suspension system for a vehicle consisting of an elongated primary spring connected intermediate its length to the vehicle axle, and a secondary spring carried by the primary spring, the improvement in the assembly attachment of the secondary spring comprising:

(a) an anchor end formed on the secondary spring for attachment to the primary spring;

(b) a saddle formation formed on the end of said secondary spring opposite said anchor end; and

(c) means provided for the attachment of said saddle formation formed on the end of said secondary spring to the primary spring, said attachment comprising,

(1) a block element positioned between the primary spring and said secondary spring and having a flat face on one surface presented to said primary spring and extending throughout the length of said block element, and a curved face on a surface opposite said flat face, said curved face varying from a thin flat at one end to a thickened portion shaped to nest in said saddle formation on the secondary spring, said thin flat at one end being interchangably positionable selectively in a direction pointed toward said anchor end or toward the end opposite said anchor end,

(2) an elongated support member having a mounting surface thereon formed to nest on said saddle formation of the secondary spring and an elongated extension surface projecting beyond said mounting surface to assume a position along side said secondary spring, and

(3) clamp means to secure said block element and said support member on opposite sides of said secondary spring with said saddle formation of said secondary spring and to secure said block element and said support member to said primary spring.

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5,035,407

## FLUID-FILLED POWER UNIT MOUNT

**Hajime Takeguchi, Yokohama; Toshiyuki Tabata, Sagamihara, and Tatsuro Ishiyama, Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd. and Bridgestone Corporation, both of, Japan**

**Filed Jun. 19, 1989, Ser. No. 367,664**
**Claims priority, application Japan, Jun. 20, 1988, 63-151504**
**Int. Cl.[5] F16F 5/00, 9/34**
**U.S. Cl. 267—140.1** **17 Claims**

1. A power unit mount for supporting on a vehicle body a power unit which generates a first vibration in a first frequency range and a second vibration in a second frequency range higher than the first frequency range, said power unit mount comprising:

an inner cylindrical member;

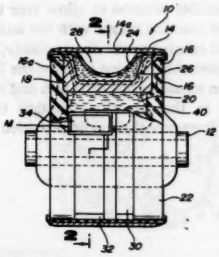
an outer cylindrical member disposed around said inner cylindrical member, the first and second vibrations being applied between said inner and outer cylindrical members;

an elastic support body securely disposed between said inner and outer cylindrical members to support load of the power unit;

a first fluid chamber formed in said elastic support body;

a second fluid chamber which is separate from said first fluid chamber and is defined, in part, by an elastic diaphragm;

a fluid which fills said first and second fluid chambers;



first and second orifice passages which fluidly connect said first and second fluid chambers and extend along the inner periphery of said outer cylindrical member and are filled with said fluid, the first fluid orifice passage being dimensioned such that the fluid within the first orifice passage has a resonance point so as to damp the first vibration and the second fluid orifice passage being dimensioned such that the fluid within the second orifice passage has a resonance point so as to damp the second vibration; and

a fluid movement controller for preventing the fluid from movement through said second orifice passage between said first and second fluid chambers under input of the first vibration and for allowing the fluid to move through said second orifice passage between said first and second fluid chambers under input of the second vibration.

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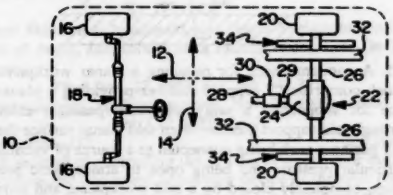
5,035,408

## JOUNCE RESPONSIVE ACTUATOR FOR PARALLEL AUXILIARY SPRING

**Erlen B. Walton, Farmington Hills; David M. Preston, Drayton Plains; James L. Oliver, Pontiac, and James A. Juriga, Bloomfield Hills, all of Mich., assignors to Eaton Corporation, Cleveland, Ohio**

**Filed Dec. 26, 1989, Ser. No. 457,026**
**Int. Cl.[5] B60G 11/10**
**U.S. Cl. 267—265** **16 Claims**



1. A vehicle comprising left and right ground engaging wheel mechanisms rotatably mounted on opposite ends of an axle assembly extending transverse to a longitudinal axis of a vehicle chassis assembly having front and rear ends; main spring means vertically supporting the chassis assembly on the

axle assembly; first and second transversely spaced apart and generally longitudinally extending auxiliary leaf springs each having a first end attached to one of the assemblies and a second end disposed for reacting against the other assembly, the auxiliary leaf springs for vertically supporting the chassis on the axle assembly in parallel with the main spring means; and an actuator means affixed to one of the assemblies and selectively operative to position a reaction means between the one assembly and a portion intermediate the ends of each auxiliary leaf spring for varying the amount of vertical support provided by the auxiliary leaf springs; characterized by:

the actuator means including means for maintaining an end of each reaction means in contact with the auxiliary leaf spring portion and control means for controlling movement of the reaction means, the control means operative in a first selectable position to allow free to-and-fro movement of the reaction means with the auxiliary leaf spring portion and relative to the one assembly, and operative in a second selectable position to allow the free movement of the reaction means in one direction and to inhibit the free movement in the opposite direction for progressively increasing the vertical support provided by the auxiliary leaf springs.

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**5,035,409**

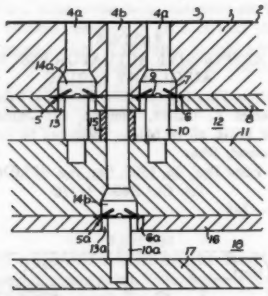
## VACUUM CHUCK

**Leslie E. Mulliner, Reading, England, assignor to MPL Precision Limited, Reading, England**

**Filed Dec. 28, 1989, Ser. No. 458,513**

**Int. Cl.[5] B25B *11/00***

**U.S. Cl. 269—21** **21 Claims**



1. A vacuum chuck for retaining a planar workpiece, the chuck comprising a support member providing a planar surface for supporting a said workpiece, passages extending through said support member from said planar surface thereof, said passages each being connected to a source of vacuum at a particular pressure and being open to atmospheric pressure unless completely closed by a said workpiece, and normally open valve means associated with each said passage, each said valve means being adapted to open or remain open when subjected to either atmospheric pressure or said vacuum pressure alone and to close when subjected to both atmospheric pressure and said vacuum pressure simultaneously.

**5,035,410**

## JIG AND JIG ARRANGEMENT

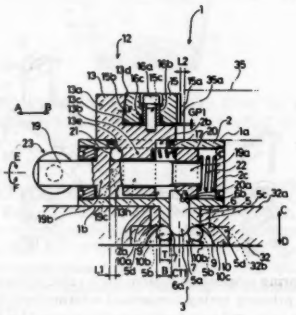
**Norihiko Shimizu, Aichi; Kanji Sato, Chiba; Toru Saiki, Aichi; Kunio Goto, Gifu; Masuo Matsubara, and Hiroshi Wada, both of Gifu, all of Japan, assignors to Yamazaki Mazak Kabushiki Kaisha, Aichi and Kabushiki Kaisha Imao Kooporeishon, Gifu, both of, Japan**

**Filed Feb. 20, 1990, Ser. No. 481,560**

**Claims priority, application Japan, Feb. 17, 1989, 1-37836; Jul. 7, 1989, 1-76487**

**Int. Cl.[5] B23Q *3/02***

**U.S. Cl. 269—136** **18 Claims**



1. A jig, comprising:

a main body;

an engaging shaft provided on said main body so as to be rotatable relative to said main body, said engaging shaft having a central axis about which said engaging shaft rotates;

a moving body, and an engaging means formed on said engaging shaft for engaging said moving body with said engaging shaft and moving said moving body along said central axis in response to rotation of said engaging shaft;

a main body fixing means for fixing said main body in place, said main body fixing means being operably connected with said moving body so as to be driven and actuated by movement of said moving body;

a workpiece clamping portion for clamping a workpiece, and a workpiece clamping portion actuating means for actuating said workpiece clamping portion to clamp a workpiece, said workpiece clamping portion actuating means being disposed on said engaging shaft and driving said workpiece clamping portion forward and backward in response to rotation of said engaging shaft.

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**5,035,411**

## FRICTION BONDING APPARATUS

**John W. Daines; Bryan L. Benn, both of Bristol, England, and Walter H. Stoll, Utting, Fed. Rep. of Germany, assignors to Rolls-Royce plc, London, England and MTU Motoren-und Turbinen-Union Munchen GmbH, Munich, Fed. Rep. of Germany**

**Filed Jun. 18, 1990, Ser. No. 539,212**

**Claims priority, application United Kingdom, Jun. 21, 1989, 8914273**

**Int. Cl.[5] B23K *20/12*; B25B *5/00***

**U.S. Cl. 269—231** **16 Claims**

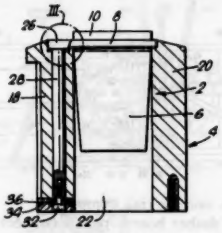
1. An assembly comprising a component holder and a component, the component holder open at one end for holding the component, the component having flange means formed thereon, the component holder comprising:

abutment means adapted for abutting the flange means of the component and for limiting penetration of the component into the component holder,

gripping means for gripping the flange means, and

pressure transmitting faces which abut the flange means of the component for imparting irrotational driving forces to generate frictional heating for welding and to exert constant pressure during bonding of the component,

wherein the flange means is provided with an inclined face and the component holder is provided with a releasable



clamping means including a wedge member having a face inclined towards the component at an angle complementary to the angle of inclination of said inclined face of the flange means and adapted to bear against said inclined face when clamped so as to positively clamp the component in the component holder against the abutment means.

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**5,035,412**

## CONTROL METHOD FOR A SORTER

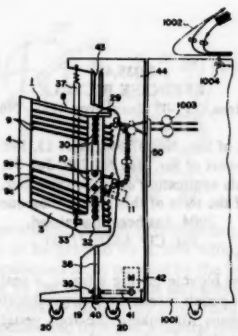
**Masakazu Hiroi, Yokohama; Masataka Naito, Kawasaki; Kimiaki Hayakawa, Yokohama; Kenji Kobayashi, Tokyo, and Mitsuhiro Mukasa, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 1, 1989, Ser. No. 304,489**

**Claims priority, application Japan, Feb. 3, 1988, 63-23126; Aug. 19, 1988, 63-207167**

**Int. Cl.[5] B42B *1/02***

**U.S. Cl. 270—053** **19 Claims**



1. A method for controlling a sheet sorter, wherein plural bins are sequentially moved to be faced to a sheet material inlet to sort the sheet materials into the bins, said method comprising the steps of:

permitting sorting operation; and

starting resetting movement to rest the plural bins after all the sheet materials which have been sorted are taken out of the bins, wherein the bins are moved by the resetting movement to a nearest position from among first and home positions, wherein the first position is a position in which the inlet is faced to a one of the bins to be last used in a next cycle operation.

**5,035,413**

## PRINTER WITH AN INITIAL SHEET-SETTING FUNCTION

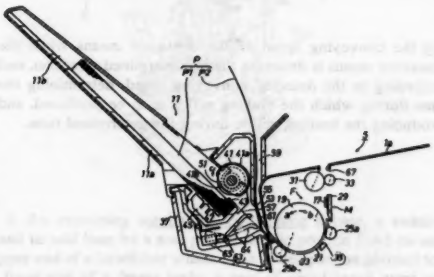
**Keiko Yamada, Aichi; Mitsunobu Suda, Nagoya; Ichirou Kawashima, Iwatsuki, and Nobuhiro Kitagawa, Yokohama, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan**

**Continuation-in-part of Ser. No. 257,020, Oct. 13, 1988, abandoned. This application Dec. 22, 1989, Ser. No. 455,136**

**Claims priority, application Japan, Oct. 16, 1987, 62-262511**

**Int. Cl.[5] B65H *3/44***

**U.S. Cl. 271—9** **6 Claims**



2. A printer comprising:

sheet feeding means for feeding a sheet forward to and backward from a printing position;

a first sheet sensor, provided before the printing position, for detecting the sheet;

a first sheet supplier for holding a plurality of separate sheets, and, in response to a sheet-demanding command, for supplying one of the sheets to a printing section of the printer;

a second sheet sensor at a sheet exit of the first sheet supplier for detecting the sheet;

a separator provided at the sheet exit of the first sheet supplier for covering the sheet exit such that the sheet is not fed backward to the first sheet supplier;

a second sheet supplier adjacent to the first sheet supplier for providing the sheet to the printing section; and

an initial sheet-setting controller for driving the sheet feeding means, in response to the external sheet setting command and detection of the sheet by the first sheet sensor and second sheet sensor, for driving the sheet feed means to feed the sheet forward until the second sheet sensor detects no sheet, then to feed the sheet forward a first predetermined distance, then to feed the sheet backward until the first sensor detects no sheet, and finally to feed the sheet forward by a second predetermined distance.

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**5,035,414**

## METHOD OF CONTROLLING DRIVING OF CONVEYOR MEANS IN AUTOMATIC DOCUMENT CONVEYING DEVICE

**Mitsugu Shibanaka, Amagasaki, and Haruo Yamamoto, Osaka, both of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan**

**Filed Nov. 27, 1989, Ser. No. 441,287**

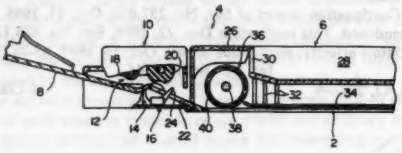
**Claims priority, application Japan, Nov. 30, 1988, 300651**

**Int. Cl.[5] B65H *7/02***

**U.S. Cl. 271—227** **10 Claims**

1. A method of controlling the driving of a conveyor means in an automatic document conveying device of the type comprising said conveyor means positioned opposite a transparent plate in an image processing machine and a reversibly rotatable electric motor for driving the conveyor means to convey a sheet-like document fed between the transparent plate and the conveyor means in a predetermined direction on the transparent plate by applying a first voltage to the electric motor to

rotate the electric motor in a first direction and drive the conveyor means in a predetermined direction, and then to stop the document at a required site on the transparent plate by producing a braking action in the electric motor and thus stopping the conveyor means; said method comprising detect-



ing the conveying speed of the conveyor means when the conveyor means is driven in the predetermined direction, and according to the detected conveying speed, determining the time during which the braking action is to be produced, and producing the braking action during the determined time.

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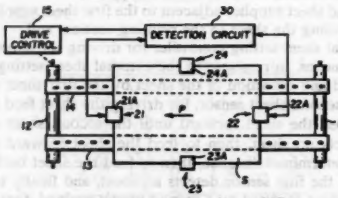
**5,035,415**

## SYSTEM FOR DETECTING THE ACCURATE POSITIONING OF SHEETS ALONG A FEED PATH BY USING CAPACITORS AS SENSORS

**J. Kelly Lee; Jon Kriegel, both of Rochester, and Thomas Stephany, Churchville, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jul. 16, 1990, Ser. No. 553,051**
**Int. Cl.[5] B65H** *7/02;* **G08B** *13/26, 21/00*
**U.S. Cl. 271—265** **6 Claims**




1. In apparatus having a sheet feed path along which sheets are to be accurately positioned at a use location(s), an improved sheet position detection system comprising:

(a) first capacitor sensing means including a first pair of parallel plate members located in opposing relation on opposite sides of the feed path plane and centered on a desired leading sheet edge position,

(b) second capacitor sensing means including a second pair of parallel plate members which are correspondingly sized and spaced to said first plate members in opposing relation on opposite sides of the feed path plane and centered on a desired trailing sheet edge position;

(c) circuit means for applying potentials across said pairs of plate members in a circuit configuration such that output signals of said first and second sensing means are subtracted from one another; and

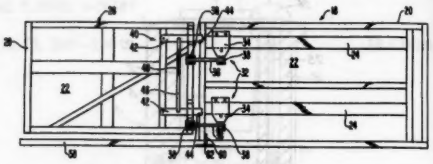
(d) means for detecting when the difference of said first and second sensing means is zero, thereby indicating the location of a fed sheet is precisely centered between said sensing means.

**5,035,416**

## SLIDING ICE RINK DOOR

**John S. Burley, Salix, Pa., assignor to Burley's Rink Supply, Salix, Pa.**

**Filed May 4, 1990, Ser. No. 519,017**
**Int. Cl.[5] E04H** *17/16;* **E05F** *11/38*
**U.S. Cl. 272—3** **9 Claims**



1. An ice rink, said ice rink comprising:

a plurality of dasher boards panels connected to form the perimeter wall of the ice rink;

at least one door unit located between two dasher board panels, said door unit including

a door member, said door member having a hinge mechanism disposed on the outside surface thereof;

a door panel member adjacent said door member, said door panel member having slide mechanism disposed on the outside surface thereof for cooperating with said hinge mechanism; and

a first latch means for latching said door member in a closed position, so that when said latch means is unlatched, said door member can slide parallel to said door panel member to permit ingress to or egress from the ice rink.

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**5,035,417**

## EXERCISE BICYCLE

**Sherwood B. Ross, 197-07 Turnberry Way, No., Miami, Fla. 33108**

**Continuation of Ser. No. 37,642, Apr. 13, 1987, which is a continuation-in-part of Ser. No. 892,788, Jul. 31, 1986, Pat. No. 4,657,244. This application Jun. 28, 1989, Ser. No. 372,892**
**The portion of the term of this patent subsequent to Apr. 14, 2004, has been disclaimed.**
**Int. Cl.[5] A63B** *21/00*
**U.S. Cl. 272—73** **6 Claims**

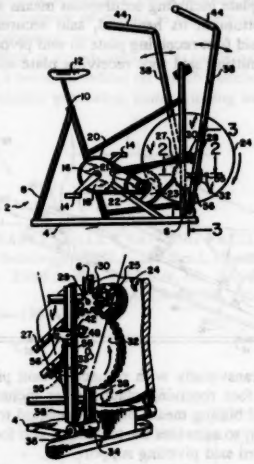
1. An exercise bicycle having a frame, a seat positioned on said frame, foot pedals means, an energy-absorbing wheel and first linkage means for linking the foot pedal means to the energy-absorbing wheel, wherein the improvement comprises:

wheel means rotatably mounted on said frame said wheel means associated with said first linkage means;

lever means pivotally mounted on said frame and interacting with said wheel means for rotation of said wheel means upon reciprocation of said lever means; and

second linkage means for linking said wheel means to the energy-absorbing wheel, whereby said first or second linkage means may independently operate said energy-absorbing wheel such that movement of said first and second linkage means may be independent from one another, said second linkage means for linking said wheel means to the energy absorbing wheel includes a first gear

positioned on an axle of said energy-absorbing wheel, a second gear in mesh with said first gear and mounted on



said frame, and an eccentric means being positioned on said second gear.

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5,035,418

## CYCLE TYPE ATHLETIC EQUIPMENT

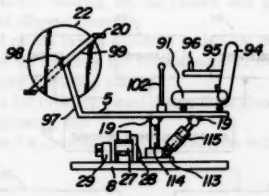
Masao Harabayashi, Kawagoe, Japan, assignor to Tokyo Sintered Metals Corp., Tokyo, Japan

Filed Aug. 10, 1989, Ser. No. 392,376

Claims priority, application Japan, Aug. 10, 1988, 63-197835; Mar. 1, 1989, 1-46565

Int. Cl.[5] A63B 23/04

U.S. Cl. 272—73 3 Claims



1. A cycle type athletic equipment comprising a seat, handlebars positioned to be gripped by a user sitting on the seat, rotary pedals positioned to be pedaled by the legs of a user, a flywheel driven by the rotary pedals and subjected to an adjustable load, a movable support for supporting the seat, handlebars, rotary pedals and flywheel, a central post connected at the upper end thereof to the central portion of the movable support by a universal joint and fixed at the lower end thereof to a swivel on a stationary stand for supporting the movable support and permitting turning of the movable support about a vertical axis, a forward and backward tilting actuator and a side tilting actuator, said forward and backward tilting actuator having an upper end connected by a universal joint to said movable support at a point spaced forward or rearward from the central portion of the movable support, said side tilting actuator having an upper end connected by a universal joint to said movable support at a point spaced sideward from the central portion of the movable support, said tilting actuators having lower ends connected to the swivel by universal joints.

5,035,419

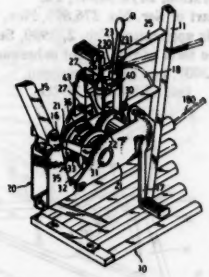
## EXERCISING MECHANISM HAVING A SELECTIVE COUPLING ASSEMBLY

Yi-Shun Chen, No. 36, Alley 23, Lane 493, Sec., 3, Chung Shan Rd., Tan Tzu Hsiang, Taichung Hsien, Taiwan

Filed Sep. 17, 1990, Ser. No. 583,546

Int. Cl.[5] A63B 23/04

U.S. Cl. 272—73 2 Claims



1. An exercising mechanism comprising a base, a saddle fixed to said base by a seat post, a handle portion fixed on an upper end of a handlebar which has a lower portion pivoted to a front end of a frame body, a pair of pedal crank arms at opposite ends of a main drive axle which is rotatably supported between a pair of frame plates of said frame body, a sprocket fixed at one end of said main drive axle for driving a chain which passes over said sprocket; a drive gear integrally fixed on said main drive axle, a shaft supported between said frame plates, two ring elements including a first ring element and a second ring element being rotatably provided on said shaft, each of said ring elements having a circular rack formed on one side thereof, said circular racks facing each other, a first spring provided between one of said frame plates and said second ring element for biasing said second ring element toward said first ring element so that said circular racks of said ring elements are engagable with each other; a driven gear being provided on said second ring element and being caused to engage with said drive gear when said circular racks of said ring elements are engaged with each other; a cam integrally fixed to said first ring element, one end of a link being rotatably coupled over said cam, and another end of said link being pivotedly connected to a lower end of said handlebar so that said handlebar can be caused to swing by a rotation of said cam via said link; said frame body further including an intermediate plate fixed to said seat post by a frame structure, a supporting plate fixed to a free end of said intermediate plate, a lever pivoted on said intermediate plate, a handle fixed to one end of said lever, a block pivoted to another end of said lever, said block being caused to move up and down by said handle, two notches being formed in said intermediate plate and being arranged so that said handle can be engaged in either of said notches, said block having a tapered lower end; a guide being slidably supported on said supporting plate and having a tapered surface formed thereon for engagement with said tapered lower end of said block, a second spring being provided to bias said guide toward said block so that said tapered lower end of said block is engagable with said tapered surface of said guide; when said handle is moved to engage within one of said notches in order to cause said block to move downward, said guide being caused to push said second ring element away from said first ring element by an engagement between said tapered surface of said block and said tapered lower end of said guide so that said drive gear and said driven gear are separated, and so that said handlebar will not be caused to swing by a rotation of said main drive axle; when said handle is moved to engage within another of said notches, said block being caused to move upward, said guide being biased toward said block by said second spring, said second ring element being biased toward said first

ring element by said first spring so that said drive gear and said driven gear are engaged with each other and so that said handlebar is caused to swing by a rotation of said cam.

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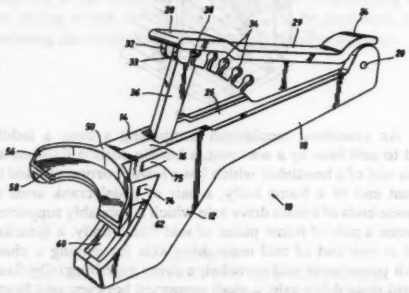
**5,035,420**

## JAW EXERCISER

Reinier Beeuwkes, III, Ardmore, Pa.; Joseph B. Stella, Amherst, N.H., and Thomas E. Salisbury, Wayland, Mass., assignors to Therabite Corporation, Bryn Mawr, Pa.

Continuation-in-part of Ser. No. 276,695, Nov. 28, 1988, Pat. No. 4,909,002. This application Feb. 2, 1990, Ser. No. 474,443
The portion of the term of this patent subsequent to Mar. 2, 2007, has been disclaimed.
Int. Cl.[5] A63B *23/00*
U.S. Cl. 272—95 12 Claims



1. A jaw exerciser for application of jaw moving force or resistance for moving the jaw and exercising the jaw muscles and temporo-mandibular joint of a patient comprising:

(a) an exerciser body being capable of supporting fixed maxillary jaw exercising means and forming curvilinear guide track means capable of receiving movable mandibular jaw means, when said jaw exerciser is being used by a patient said curvilinear guide track means being located in front of the temporo-mandibular joint of the patient;

(b) maxillary jaw means extending from said exerciser body and having a maxillary jaw engaging member adapted for force transmitting engagement with maxillary tissues of the mouth of the patient;

(c) mandibular jaw means being movably received by said exerciser body and being located on one side of said curvilinear guide track means, said mandibular jaw means having a mandibular jaw engaging member adapted for force transmitting engagement with the tissues of the mandible of the patient, said mandibular jaw means being received in guided relation with said guide track means;

(d) said curvilinear guide track means being defined by at least one center of curvature located on the same side of said guide track means as said mandibular jaw engaging means, said guide track means having a configuration establishing predetermined therapeutic exercise movement of the patient's jaw by said mandibular jaw means; and

(e) a mechanical linkage being connected to said exerciser body and having driving connection with said mandibular jaw means, said mechanical linkage being actuated for inducing movement of said mandibular jaw means relative to said exerciser body and said maxillary jaw means.

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**5,035,421**

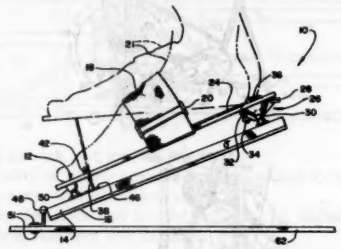
## THERAPEUTIC DEVICE

Dennis M. Scheller, 7121 Riverview Ter., Fridley, Minn. 55432

Filed Nov. 16, 1990, Ser. No. 614,925
Int. Cl.[5] A63B *23/04, 23/08, 23/10*
U.S. Cl. 272—96 8 Claims

1. An exercise apparatus comprising a foot receiving plate, a pivoting support, substantially conforming to the shape of the foot receiving plate and a base;

said foot receiving plate having a top and a bottom, a heel end and a toe end, and a foot retention means, said foot receiving plate including securement means adjacent and on the bottom of its heel end, said securement means securing said foot receiving plate to said pivoting support while permitting said foot receiving plate to pivot later-



ally and transversely with respect to said pivoting support, said foot receiving plate further including biasing means, said biasing means being connected to said pivoting support, so as to bias the toe end of said foot receiving plate toward said pivoting support;

said pivoting support being pivotably mounted to said base beneath the toe end of said foot receiving plate so as to permit said foot receiving plate and said pivoting support to be pivoted away from said base.

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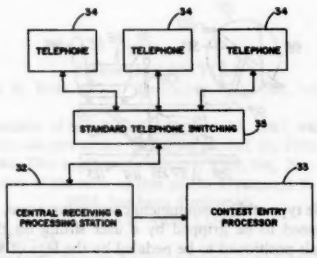
**5,035,422**

## INTERACTIVE GAME SHOW AND METHOD FOR ACHIEVING INTERACTIVE COMMUNICATION THEREWITH

Robert Berman, 16 Silvermine Woods, Wilton, Conn. 06897

Filed Dec. 7, 1989, Ser. No. 447,884
Int. Cl.[5] A63F *9/22*
U.S. Cl. 273—439 15 Claims




1. A method for providing a televisable game show in which the home viewing audience and the studio audience are able to directly participate by having a chance to win prize awards comprising the steps of:

A. selecting at least two contestants;

B. establishing a pool comprising a fixed quantity of unique indicia;

C. requiring one contestant to select and earn the right to have one of the indicia in the pool, placed in that contestant's personal indicia set, said indicia set comprising a fixed number of available spaces, said fixed number being substantially smaller than the total number of available indicia;

D. requiring each other contestant to individually select and earn the right to have one indicia from the pool placed in that contestant's personal indicia set;

E. repeating the indicia selection and earning steps for a pre-determined time period or until the contestants have filled the spaces available in their personal indicia set;

F. randomly selecting a game winning indicia set from the entire pool of indicia, said game winning indicia set having the same number of indicia as the personal indicia set of each contestant; and

G. awarding a grand prize to a participating contestant having a personal indicia set which matches in its entirety the randomly generated, game winning indicia set.

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**5,035,423**

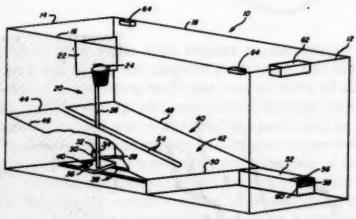
**BASKETBALL TRAINING FACILITY**

**Richard J. Arciniega, 10637 Braes Bend, Houston, Tex. 77071**

**Filed Jun. 5, 1990, Ser. No. 533,487**

**Int. Cl.[5] A63B *63/08***

**U.S. Cl. 273—150 A** **39 Claims**



12. A basketball training facility for use by a player in practicing shooting a basketball comprising:

(a) an enclosed area, the enclosed area having a floor, a front wall, two side walls and a back wall;

(b) a basketball backboard and goal, the backboard and goal being mounted on a vertical support member within the enclosed area;

(c) means for rotating the backboard and goal about the vertical support member;

(d) a ball return means mounted within the enclosed area;

(e) means for indexing the vertical support member toward and away from said player;

(f) means for creating visual distractions along the walls of the enclosure; and

(g) means for creating audial distractions within the enclosure.

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**5,035,424**

**DEVICE FOR BATTING AND STRIKING PRACTICE**

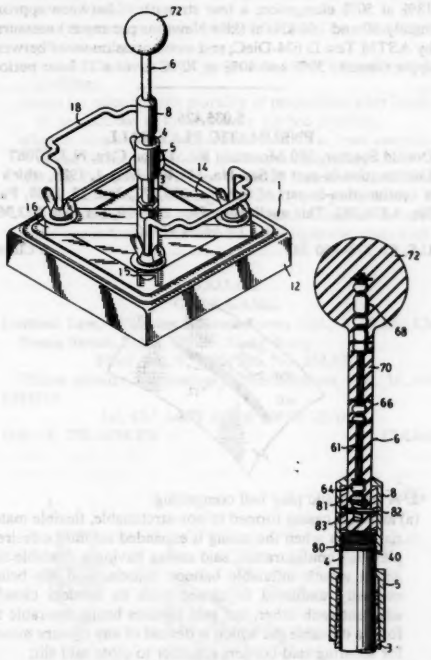
**Leon Liao, No. 85-3, Yu Min St., Chang Hua City, Taiwan**

**Filed Jul. 3, 1990, Ser. No. 547,917**

**Int. Cl.[5] A63B *69/00***

**U.S. Cl. 273—26 R** **5 Claims**

1. A device for batting and striking practice comprising a base assembly, a vertically extending tube attached to said base assembly; an elongated, vertically extending support member coupled to an upper end of said tube by a fastening means, said support member includes a shell and a core element embedded in said shell, a body member integrally formed on an upper end of said support member, a first element clamped to a lower end of said core element, a second element clamped to an upper end of said core element and embedded in said body member, and each of said first element and said second element has at least one ring portion extended outward therefrom so that said



core is stably retained and embedded in said shell and said body.

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**5,035,425**

**MULTIPLE PURPOSE PLAY BALL**

**Phillip L. Edwards, 33 Radnor Cir., Grosse Pointe Farms, Mich. 48236**

**Filed Dec. 3, 1990, Ser. No. 620,742**

**Int. Cl.[5] B29C *27/08*; A01K *29/00***

**U.S. Cl. 273—60 B** **5 Claims**

1. A multiple purpose play ball comprising a spherical shell of polyurethane forming a hollow spherical interior, said shell having a wall thickness sufficient to return said shell to its original shape on impact with a solid surface and such that said ball rebounds almost to its original height when dropped onto a solid surface, said shell having a hardness ranging between approximately 35 and 60 Shore D as measured by the ASTM (Americal Society of Testing Materials) test 2240; an ultimate tensil strength between approximately 20 and 25 MPa (mega pascals) measured by ASTM test D412; an ultimate elongation ranging between approximately 500 and 600%; a tensil

strength between approximately 6.9 and 16.5 MPa at 100% elongation; and between approximately 10.3 and 19 MPa at 300% elongation; a tensil strength of approximately 3% to 18% at 50% elongation; a tear strength of between approximately 80 and 140 kN/m (kilo Newtons per meter) measured by ASTM Test D 624-DieC; and a compression set of between approximately 30% and 40% at 70° C. over a 22 hour period.

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**5,035,426**

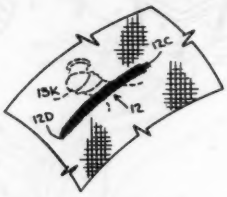
**PNEUMATIC PLAY BALL**

**Donald Spector, 380 Mountain Rd., Union City, N.J. 07087**

**Continuation-in-part of Ser. No. 345,405, May 1, 1989, which is a continuation-in-part of Ser. No. 205,477, Jun. 13, 1988, Pat. No. 4,834,382. This application Dec. 6, 1990, Ser. No. 622,960**

**Int. Cl.[5] A63B *41/00***

**U.S. Cl. 273—65 EG** **6 Claims**




1. A pneumatic play ball comprising:

(a) an outer casing formed of non-stretchable, flexible material which when the casing is expanded assumes a desired play ball configuration, said casing having a dilatable slit and a mouth inflatable balloon therein, said slit being normally undilated or closed with its borders closely adjacent each other, but said borders being separable to form a dilatable slit which is devoid of any closure means for securing said borders together to close said slit;

(b) said mouth-inflatable balloon having a rubber skin and a knottable air-passage stem projecting outward therefrom, the characteristics of said casing and slit being such that said balloon in its uninflated state may be admitted into said casing through an open port created by dilating or separating the borders of the slit, the stem then projecting out of the port so that the balloon can be mouth-inflated within the confines of the casing to a degree causing the skin to stretch to conform to and press against the inner surface of the casing to subject the casing to tension, after which the stem may be knotted to prevent the escape of air from the balloon and be pushed into said open port, whereby the slit then, as a result of casing tension, is allowed to recover its undilated, substantially closed state and no portion of the inflated balloon can be extruded from the casing when the ball bounces, the flexibility of said casing and balloon being such that when said balloon is filled with compressible air, subjecting said casing to tension, the fingers of a small child grasping the ball will temporarily indent the ball to give the child a good grip on the ball.

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**5,035,427**

**BALL HITTING AND RECEIVING DEVICE**

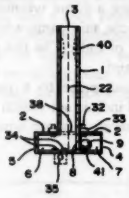
**Pan B. S. Chen, P.O. Box 15316, Arlington, Va. 22215**

**Filed Sep. 17, 1990, Ser. No. 584,567**

**Int. Cl.[5] A63B *59/00, 65/00***

**U.S. Cl. 273—67 R** **5 Claims**

1. A ball hitting and receiving device, comprising mainly a longitudinal portion (1), a transverse portion (2), and at least one striking face (5) provided on the transverse portion (2), wherein the longitudinal portion (1) is hollow and has open ends at both ends thereof, the transverse portion (2) is hollow and has an open end at one end (4) thereof, a partition plate (8) is provided to divide the transverse portion (2) into the sections, and the transverse portion (2) has a cutaway part so that the longitudinal portion (1) can communicate with the transverse portion (2) and a ball can go from the longitudinal portion (1) to the transverse portion (2) and vice versa.

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**5,035,428**

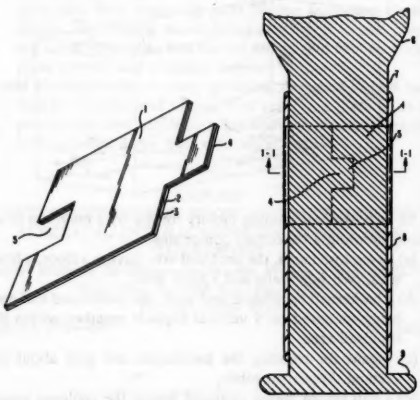
**ROTATING GRIP FOR A BASEBALL BAT**

**Robert J. Bartkowicz, 3 Canal St., Sayreville, N.J. 08872**

**Filed Dec. 13, 1989, Ser. No. 450,159**

**Int. Cl.[5] A63B *59/06***

**U.S. Cl. 273—72 R** **3 Claims**




1. A rotating gripping element adapted to be wrapped around the handle of a baseball bat, said handle having a flexible cover applicable thereover, said rotating gripping element being covered by said cover and comprising a thin flexible, flat material having two layers, the first layer comprising an outer, gripping, non-slip surface and the second layer comprising an inner facing adapted to face the surface of the bat handle and having a high slip surface, said gripping element having a notching means so that when said gripping element is wrapped around said handle of said bat, with said inner facing on said handle, with said gripping, non-slip surface supra thereto, said notching means are engaged so that when said cover is applied thereover, said rotating gripping element will remain on said handle when force is applied thereto.

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**5,035,429**

**STRING STRAIGHTENER FOR TENNIS RACKET**

**Allan Redrow, Apt. #6, 12 Brookside Ave., Worcester, Mass. 01602**

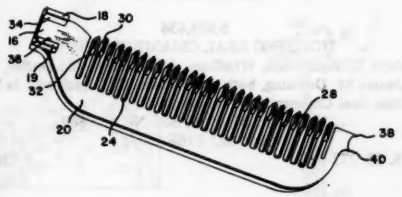
**Filed Jul. 9, 1990, Ser. No. 550,019**

**Int. Cl.[5] A63B *51/00***

**U.S. Cl. 273—73 R** **12 Claims**

1. A straightener that is self adjustable to fit onto and coact with the strings in the head of a tennis racket, said head having any one of a variety of the different woven patterns having different spacings between the strings forming the spaced apart

main and cross strings in a tennis racket, the woven patterns each having a thickness defined by a generally planar front side surface and a generally planar back side surface, said straightener comprising a substantially rigid body having a planar bottom surface that has a sliding contact on the plane of one of said front or back surfaces of the woven pattern of the strings, said body supporting a plurality of flexible arms that extend outwardly in the same direction from said body, each one of said arms having a free end that coincides with said plane of the planar bottom surface of said body, said arms being disposed in a substantially parallel relation one with respect to the other, each one of said arms having a tooth integral with its free end, said teeth all extending in the same direction and at




generally a right angle with respect to said planar bottom surface of said body, the shape of each tooth and the dimensions of said shape being such that two or more of said teeth may fit simultaneously into and extend through one of said spacings into which one or more of said teeth may be pressed when said planar bottom surface of said body is pressed against said one surface of said woven pattern, each one of said teeth having at least one exposed surface for engaging with a string when fitted into its respective space, all of said string engaging surfaces of said teeth being positioned along a straight line to be in alignment one with respect to the other before said arms are pressed against said one surface, and said body having a length to extend across a plurality of said spaces between the strings in said pattern.

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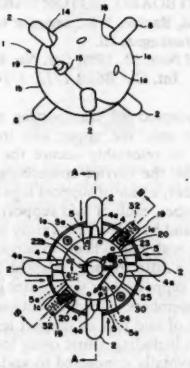
**5,035,430**

## PUSH PIN PUZZLE WITH INTERNAL LOCKING MECHANISM

**Toshio Suzuki, Tokyo, Japan, assignor to Toybox Corporation, Topkyo, Japan**

**Filed Jan. 9, 1990, Ser. No. 462,596**
**Claims priority, application Japan, Mar. 27, 1989, 1-34429[U]**
**Int. Cl.[5] A63F *9/08***
**U.S. Cl. 273—153 S** **20 Claims**



**1. A puzzle toy comprising:**

a body having an interior and a plurality of openings;

a plurality of projections movably mounted in corresponding openings, and projecting outwardly therefrom in a normal position;

means disposed in the interior of the body for mounting the plurality of projections;

means for latching each projection in an inwardly pushed position;

means for releasing the plurality of projections after latching all projections in the inwardly pushed position;

wherein some of the projections include at least one detent which forms part of the latching means; and

wherein the latching means includes first and second rotatable plates, each having a plurality of peripherally disposed spaced apart abutments which catch the detents of the projections when moved into alignment therewith.

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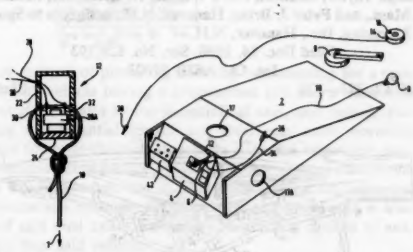
**5,035,432**

## GOLF GAME

**Garland Lew, Wiltronic Manufacturers Ltd., 1, Wong Chuk Yeung Street, Fotan, Shatin, Hong Kong**

**Filed Aug. 9, 1990, Ser. No. 564,889**
**Claims priority, application United Kingdom, Aug. 16, 1989, 8918715**
**Int. Cl.[5] A63B *69/36*; H01H *25/00***
**U.S. Cl. 273—176 FA** **13 Claims**



**1. A golf game comprising a ball tethered to a pivotable control means of a controller, first switch means incorporated in the tethering means, processing means and display means, the arrangement being such that when the tethering means is taut, as at a point during the drive of the ball, the first switch means is triggered to cause data on the position of the control means to be fed to the processing means which determines the trajectory and distance of the drive and displays this information on the display means.**

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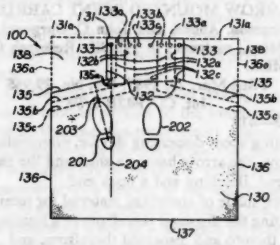
**5,035,433**

## GOLF SWING TRAINING MAT

**Joseph M. Durso, 1404 Crowell Rd., Vienna, Va. 22182**

**Continuation-in-part of Ser. No. 542,774, Jun. 25, 1990. This application Jul. 17, 1990, Ser. No. 533,313**
**Int. Cl.[5] A63B *69/36***
**U.S. Cl. 273—187 A** **12 Claims**



**1. An article of manufacture comprising a golf swing train-**

ing mat, having a hitting surface made of a material that nearly looks and gives a feeling of real grass and that is not easily destroyed by repeated swings of a golf club striking the material, and also having a soft underpad, such that a golfer is able and is encouraged to realistically practice hitting down and through a golf ball as is to be done with an iron shot to obtain good backspin and hence, loft, and such that bounce-back or shock can be generally eliminated, and the golfer can thus practice a fluid iron stroke generally without mat-caused interruption, and having at least one follow-through notch, in part defined by a hitting area edge segment perpendicular to an intended line of flight of the golf ball to be struck by the golfer from the hitting surface, and which is trapezoidal and is additionally defined by an obliquely-angled edge segment obliquely angled to and abutting the hitting area edge segment, which envoids an area such that the golfer, when swinging an iron, can properly follow through downwardly after striking a golf ball with a golf club into the downwardmost portion of the swing when the ball is struck near the edge of the mat on the hitting area, and which allows for the golfer to follow through in a practice swing without striking the obliquely-angled edge segment.

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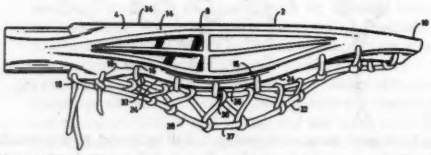
**5,035,434**

## LACROSSE STICK HEAD WITH BULGED SIDE WALLS

**Joseph Taylor, Manlius, N.Y.; William H. Brine, III, Mendon, Mass., and Peter J. Brine, Hanover, N.H., assignors to Sports Licensing, Inc., Hanover, N.H.**

**Filed Dec. 14, 1990, Ser. No. 628,193**
**Int. Cl.[5] A63B *59/02***
**U.S. Cl. 273—326** **9 Claims**



1. A lacrosse stick head comprising a frame and netting attached to said frame, said frame comprising side wall means extending from a throat portion of said frame, said side wall means having a bottom edge thereof extending outwardly such as generally to define a bulge in the bottom of said side wall means generally about midway of the length of said side wall means, said side wall means having holes therein proximate said bottom edge, said netting being attached to said wall means by portions of said netting disposed in said side wall means holes, said netting defining a ball pocket disposed generally alongside and beneath said bulge and generally midway sidewise of said netting, whereby to provide a lacrosse stick head having a ball pocket spaced from said throat portion of said frame and said side wall means.

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**5,035,435**

## ARROW MOUNTED SCENT CARRIER

**John R. Burgeson, Anoka, and John C. Burgeson, Shoreview, both of Minn., assignors to Wildlife Research Center, Inc., Anoka, Minn.**

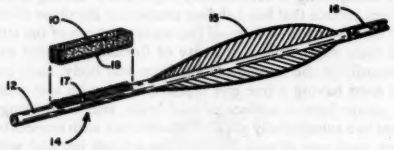
**Filed Mar. 25, 1987, Ser. No. 29,965**
**Int. Cl.[5] F42B *6/04***
**U.S. Cl. 273—418** **8 Claims**

1. A hunting scent dispersing device, comprising:

a. an arrow, the arrow having a shaft and the shaft having a point end, fletching and a nock end,

b. a carrier, made of absorbent material for retaining and for permitting the dispersal therefrom of a hunting scent to be added thereto and dispersed therefrom, and

c. attachment means for securing the carrier to the shaft adjacent the fletching and nock end thereof to assure the carrier will be sufficiently held off the ground to allow



good dispersal after the arrow has been shot in a high arc and landed on the ground.

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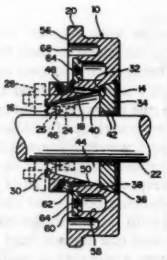
**5,035,436**

## HOUSING SEAL CHAMBER BODY

**Robert E. Rockwood, Windham, N.H.; Henry S. Duffee, and James M. Downing, both of Florence, S.C., assignors to Five Star Seal Corporation, Florence, S.C.**

**Filed Apr. 24, 1990, Ser. No. 513,889**
**Int. Cl.[5] F16J *15/16***
**U.S. Cl. 277—25** **9 Claims**



1. A seal chamber housing including inboard and outboard sides and a central annular body defining a central opening extending therethrough for receiving a rotary shaft, said opening including a fluid end portion and an atmosphere end portion, said fluid end portion tapering toward the atmosphere end portion of the opening, said atmosphere end portion tapering away from said fluid end portion at a greater taper angle than that of said fluid end portion, said atmosphere end portion and said fluid end portion include co-acting stationary and rotary seal components disposed radially inwardly and operatively associated with said shaft.

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**5,035,437**

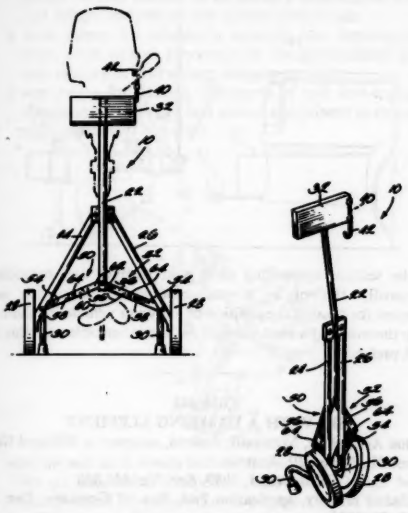
## OUTBOARD MOTOR CARRIER

**Lee A. Woodward, Racine, Wis., assignor to Outboard Marine Corporation, Waukegan, Ill.**

**Filed Nov. 13, 1989, Ser. No. 434,895**
**Int. Cl.[5] B62B *1/12, 1/14***
**U.S. Cl. 280—40** **3 Claims**

2. A carrier adapted for transporting an outboard motor having an upper unit, the upper unit including a transom bracket adapted to releasably secure the upper unit to the transom of a boat, the carrier comprising a frame having a center post member, a pair of support legs hingedly supported by said post member, each of said support legs rotatably supporting a wheel and having a rearwardly extending fixed portion cooperating with said wheels to support said frame in an upright position, a false transom adapted to receive the transom bracket and supported by said center post member, a first pair of locking members extending between said center post member and one of said pair of support legs, said first pair of locking members including a first outer locking member having a first end pivotally connected to said one of said pair of support legs and a second end, and a first inner locking member

having a first end pivotally connected to said second end of said first outer locking member and a second end pivotally connected to said center post, and a second pair of locking members extending between said center post member and the other of said pair of support legs, said second pair of locking



members including a second outer locking member having a first end pivotally connected to said other of said pair of support legs and a second end and a second inner locking member having a first end pivotally connected to said second end of said second outer locking member and a second end pivotally connected to said center post.

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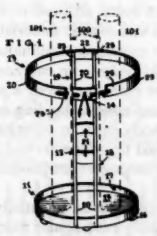
**5,035,438**

## GULL WING CART APPARATUS

**Tom A. Cronquist, P.O. Box 291, Boonville, Calif. 95415**

**Filed Jun. 4, 1990, Ser. No. 532,717**
**Int. Cl.[5] B62B *3/04***
**U.S. Cl. 280—79.5** **4 Claims**



1. A wheeled gull wing cart apparatus in combination with elongated generally cylindrical objects such as rolls of flooring material wherein the apparatus comprises:

a wheeled base unit including a generally flat circular base member having a raised peripheral lip;

support units comprising relatively elongated front and rear support members wherein the bottom of the support members are attached to the base member and the upper portion of the support members are provided with at least one plate element; wherein, the front and rear support members each include a pair of support legs connected together by said at least one plate element;

capture units comprising curved capture arms pivotally secured to the upper portion of the rear support member; and,

means on said front support member for releasably securing the other end of the capture arms to the front support member; wherein, the capture arms are disposed at a height generally proximate to the midpoint of the said elongated generally cylindrical objects.

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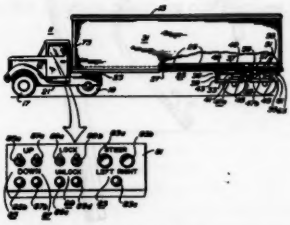
**5,035,439**

## METHOD AND MEANS FOR PROVIDING REAR STEERABILITY IN A TRAILER ASSEMBLY

**Patrick G. Petrillo, R.D. 2, Box 344, Milford, N.J. 08848**

**Filed May 2, 1989, Ser. No. 346,038**
**Int. Cl.[5] B60G *11/26*; B62D *1/02, 13/00***
**U.S. Cl. 280—81.6** **37 Claims**



1. A method of providing auxiliary rear steering for a transport-type vehicle having a longitudinal axis and a transverse axis at right angles to the longitudinal axis, said vehicle also having a substantial length and dual rear axles normally aligned for over-the-road operation with the transverse axis, said vehicle being further provided with a vertical axle movement effecting means for at least one of said dual axles and transverse axle rotation effecting means associated with at least one of said dual axles, comprising, when it is desired to auxiliarily steer said vehicle:

(a) relieving the weight of said vehicle and any load thereupon from the one of said dual axles provided with the transverse axle rotation effecting means by at least partially raising said one dual axle relative to the other axle by operating the vertical axle movement effecting means,

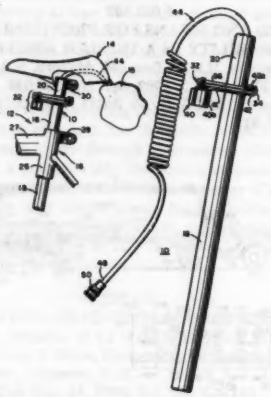
(b) when at least a substantial proportion of the combined weight of the vehicle and any load thereupon is relieved from said transversely rotatable axle, transversely rotating said transversely rotatable axle a predetermined amount deviating from alignment with the transverse axis of said vehicle to a non-transversely oriented alignment by operating said transverse axle rotation effecting means, the other dual axle remaining substantially aligned with the transverse axis of said vehicle,

(c) after said transversely rotatable axle is rotated said predetermined amount, reapplying the combined weight of the vehicle and any load thereupon to the non-transversely oriented rotated dual axle by lowering said non-transversely oriented axle relative to the other dual axle,

(d) at least partially removing the combined weight of the vehicle and any load thereupon from the transversely aligned axle by raising it relative to the non-transversely aligned axle,

(e) moving the vehicle in a direction having a substantial component of motion parallel to the longitudinal axis of the vehicle so that the non-transversely aligned rear axle initiates a component of motion of the rear portion of the vehicle at least partially to the side or with a component of motion transverse with respect to the longitudinal axis of the vehicle in a desired direction, whereby the rear of the vehicle is caused to track in a different direction than it would otherwise upon activation of drive wheels associated with said vehicle.

**5,035,440**
**PUMP**
**Gilmore H. Chappell, Deptford, N.J., assignor to Chappell International, Inc., Westville, N.J.**
**Filed Aug. 9, 1989, Ser. No. 391,350**
**Int. Cl.[5] B65B *3/04***
**U.S. Cl. 280—201** **19 Claims**



1. A manually-operable bicycle seat post air pump comprising:

a housing containing a pump chamber having a closed end;

a piston assembly including a piston within the chamber, a connecting arm having a first end coupled with the piston and an opposing second end, and an air passage extending generally axially through the piston;

means coupled with the connecting arm for manually reciprocating the piston in the chamber;

first, one-way valve means on the piston for compressing air in the closed end of the chamber when the piston is moved in a first axial direction towards the closed end of the chamber and for permitting air to enter the closed end of the chamber when the piston is moved in a second, opposing axial direction away from the closed end of the chamber; and

second, one-way valve means along the air passage for permitting air to pass from the chamber into the air passage when the piston is being moved in the first axial direction and for preventing air from passing through the air passage into the chamber when the piston is being moved in the second axial direction; wherein the housing comprises a first elongated tube having an outer diameter sufficient to permit the first tube to be removably received and clamped in a seat tube of a bicycle frame, and the means for manually reciprocating comprises a second elongated tube having an outer diameter sufficient to permit the second tube to be removably received and clamped in a seat post collar of a bicycle seat and further comprising means for releasably immovably securing together the first and second elongated tubes.

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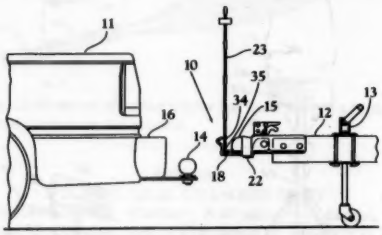
**5,035,441**
**TRAILER HITCH ALIGNMENT DEVICE**
**Donald W. Murray, Ft. Worth, Tex., assignor to Spectra Technologies Inc., Arlington, Tex.**
**Continuation of Ser. No. 344,020, Apr. 27, 1989, abandoned. This application Apr. 20, 1990, Ser. No. 511,844**
**Int. Cl.[5] B60D *1/40***
**U.S. Cl. 280—477** **8 Claims**

1. An improved trailer hitch alignment device of the type wherein at least one sighting member is provided for securement to the towed vehicle above a hitching element thereon, the improvement comprising an adapter constructed for securement to said hitching device, said adapter comprising an elongate base region adapted for matingly engaging said hitching device, means for securing said base region to said hitching device, a frontal body section having a lower bumper region adapted for extending outwardly of said hitching device, and a



probe section upstanding from said bumper and extending forwardly thereof in pivotal relationship therewith and adapted for sensing the position of a towing vehicle in relationship thereto, and a mast adapted for the mountable coupling to said probe.

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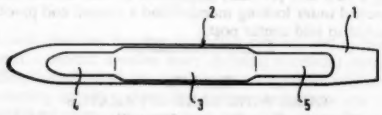
**5,035,442**
**SKI WITH A DAMPING ELEMENT**
**Anton Arnsteiner, Mittersill, Austria, assignor to Blizzard Ges. m.b.H., Mittersill, Austria**
**Filed Dec. 1, 1989, Ser. No. 444,359**
**Claims priority, application Fed. Rep. of Germany, Dec. 1, 1988, 3840553**
**Int. Cl.[5] A63G *5/07***
**U.S. Cl. 280—602** **20 Claims**



1. A ski comprising

a ski body,

a layer or sheet attached to an uppermost surface of said ski body,

said layer or sheet being adapted to damp vibrations and being made of a viscoelastic material,

said layer or sheet extending continuously from a zone of a shovel of said ski body to an end zone of said ski body,

said layer or sheet extending from a zone in front of said shovel to said end zone, extending to a distance from an end of said ski body equal to a distance the layer or sheet extends from a ski tip of the ski body,

said layer or sheet having a broad middle zone and a narrow end zone,

the layer or sheet includes an essentially rectangular middle zone and essentially rectangular narrower end zones.

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**5,035,443**
**RELEASABLE SNOWBOARD BINDING**
**Chris V. Kincheloe, 3602 Hunts Point Rd., Bellevue, Wash. 98004**
**Filed Mar. 27, 1990, Ser. No. 500,298**
**Int. Cl.[5] A63C *9/00***
**U.S. Cl. 280—618** **13 Claims**

1. A releasable foot binding apparatus for use in combination with a snowboard, comprising:

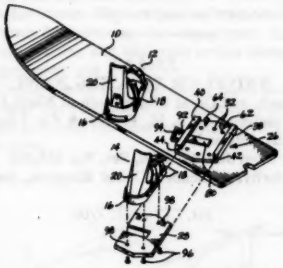
a socket component mounted on said snowboard, including first and second spaced-apart upwardly-extending elon-

gated siderails, each said siderail having an elongated flange portion extending laterally therefrom;

a foot-engaging component longitudinally engageable with said socket component, said foot-engaging component having a bottom and including opposite side ribs positioned on said bottom to be slidably positionable below said flange portions of said socket component;

a latch means for releasably securing said foot-engaging component against movement in one longitudinal direction relative to said socket component; and

a stop means for limiting movement of said foot-engaging component relative to said socket component in an opposite longitudinal direction,



wherein said latch means includes a displaceable pawl member on said socket component, said pawl member being spring biased into a position to engage a notch formed in said foot-engaging component when said component is engaged with said socket component, and

wherein said pawl member includes a portion extending outwardly of said socket component to a position accessible when said foot-engaging component is engaged in said socket component, such that said outwardly extending portion may be moved to in turn displace said pawl member and release said foot-engaging component for longitudinal removal from said socket component.

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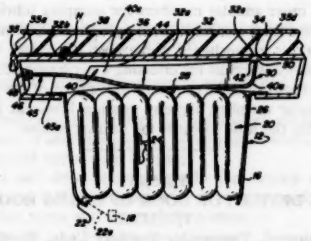
**5,035,444**

## SINGLE CUTTER SELF-PIERCING COVER ASSEMBLY FOR AIRBAG

**James C. Carter, Dover, N.H., assignor to Davidson Textron Inc., Dover, N.H.**

**Filed Oct. 22, 1990, Ser. No. 601,406**
**Int. Cl.[5] B60R *21/16***
**U.S. Cl. 280—732** **19 Claims**



1. A cover assembly for concealing an airbag restraint system including an airbag, a housing for the airbag, a gas generator located in the housing for supplying gas to the air bag in response to vehicle impact the cover assembly comprising:

an outer shell, a backing layer of foam on said shell and a retainer insert member for securing the cover assembly on a support;

a cover insert member inboard of said foam layer having four side edges thereon forming an opening with respect to said retainer insert member;

a single cutter means pivotally connected to said retainer insert member at a recessed position inboard of said outer shell; said single cutter means including a plurality of sharp cutting edges located adjacent three of said four side edges prior to deployment of said airbag;

actuator means responsive to deployment of said airbag to cause said single cutter means to pivot with respect to said retainer insert member to cause said sharp cutting edges to sequentially cut through said foam layer and said outer shell at said opening between said insert cover member and said retainer insert member for forming a three sided opening in said outer shell before said cover insert member is displaced and said cover insert member thereafter being engaged by said airbag during its deployment to open so as to define a passage for deployment of said airbag into a vehicle passenger compartment.

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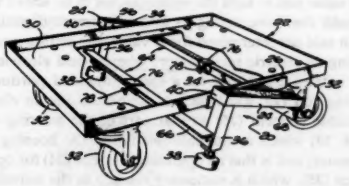
**5,035,445**

## BRAKE MECHANISM FOR CARTS AND DOLLIES

**Willie F. Poulin, 10647½ Crockett St., Sun Valley, Calif. 91352**

**Filed Jan. 26, 1990, Ser. No. 470,779**
**Int. Cl.[5] B60S *9/02***
**U.S. Cl. 280—763.1** **20 Claims**



1. A brake mechanism in combination with a movable platform mounted on freely rotatable casters, said brake mechanism comprising:

first and second foot pedals, said pedals being operatively connected to at least one friction foot disposed below the platform;

bracket means for mounting said first and second foot pedals at opposing locations on the movable platform, said foot pedals being pivotably attached to the bracket means such that said pedals are pivotable to a first position, whereat the at least one friction foot is raised out of engagement with a floor surface underlying the casters, and a second position, whereat the pedals are oriented horizontally and the at least one friction foot frictionally engages with the floor surface to thereby retain the platform in a stationary position;

stop means for prohibiting the foot pedal's from pivoting to a vertical orientation;

releasable lock means for maintaining the pedals in the second position; and

at least one crossbar passing beneath the movable platform to connect said first and second foot pedals such that said pedals pivot in unison upon actuation of either pedal.

**5,035,446**

## ADJUSTABLE STEERING WHEEL

**Hans-Olof Arvidsson, Gothenburg, Sweden, assignor to AB Volvo, Gothenburg, Sweden**

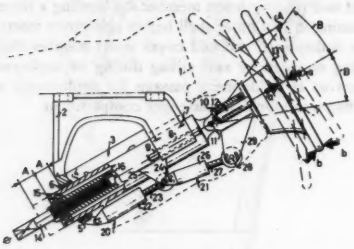
**PCT No. PCT/SE88/00317, § 371 Date Nov. 28, 1989, § 102(e) Date Nov. 28, 1989, PCT Pub. No. WO88/10205, PCT Pub. Date Dec. 29, 1988**

**PCT Filed Jun. 13, 1988, Ser. No. 435,470**

**Claims priority, application Sweden, Jun. 15, 1987, 870248**

**Int. Cl.[5] B62D *1/18***

**U.S. Cl. 280—775** **5 Claims**



1. A steering wheel arrangement for automotive vehicles, including a steering wheel, a steering column carrying the steering wheel and housing a steering shaft, and means for adjusting the position of the steering wheel in the direction of the steering column and/or with regard to an angle to said column, the adjustment means comprising at least one setting motor (20, 21) for effecting adjustment movements of the steering wheel relative to the steering column, and means (34, 35, 36) for detecting the force acting on the steering wheel (13) in the adjustment direction said force detecting means being adapted to start the setting motor when the force acting on the steering wheel (13) in said adjustment direction has a predetermined value and to hold the setting motor in an active running state until the force acting in said adjustment direction falls beneath said predetermined force value, the setting motor (20, 21) being an electric servomotor, wherein said electric servomotor rotates a nut (32) on a screw-threaded portion of an operating rod (23, 27) which is connected via an elastically deformable element (36) to that part of the steering column tube (4; 10) which is movable relative to the housing of said servomotor; and in that an operating element (34) for operating a switch (35), which is stationary relative to the movable tube part of said steering column, is so connected to the operating rod (23, 27) that the operating element will bring the switch to an activated state upon a given state of deformation of the elastically deformable element (36).

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**5,035,447**

## BINDING ELEMENT FOR BINDING LOOSE SHEETS IN A FILE

**Carla P. Lolli, J. Van Rijswijcklaan 76, 2018 Antwerpen, Belgium**

**PCT No. PCT/BE89/00028, § 371 Date Feb. 15, 1990, § 102(e) Date Feb. 15, 1990, PCT Pub. No. WO89/12554, PCT Pub. Date Dec. 28, 1989**

**PCT Filed Jun. 16, 1989, Ser. No. 477,802**

**Claims priority, application Belgium, Jun. 17, 1988, 8800689**

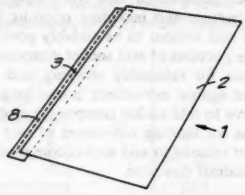
**Int. Cl.[5] B42D *1/00, 15/00***

**U.S. Cl. 281—15.001** **12 Claims**

1. A binding element for binding loose sheets in a file comprising:

a sheet of relatively stiff material; and

a strip of glue meltable under the influence of heat positioned along at least a portion of a side of the sheet and extending beyond the side of the sheet, the strip of glue having a pair of adhesable exposed surfaces, the strip of glue further




being attached to the sheet but unattached to any other non-adhesive or backing material.

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**5,035,448**

## SWIVEL OR ROTATING JOINT

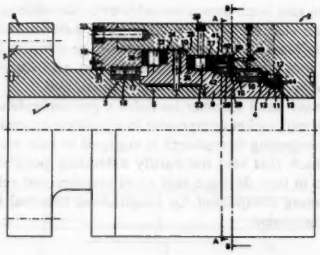
**Colin Seabrook, and David Makin, both of North Humberside, England, assignors to J. H. Fenner & Co. Limited, North Humberside, England**

**Filed Jan. 11, 1990, Ser. No. 463,432**

**Claims priority, application United Kingdom, Jan. 11, 1989, 8900577**

**Int. Cl.[5] F16L *7/00***

**U.S. Cl. 285—94** **7 Claims**



1. A swivel joint for interconnecting two lengths of pipe, comprising an inner annular member adapted, in use, to be connected to a first length of pipe and an outer annular member co-axial with the inner annular member, and adapted, in use, to be connected to a second length of pipe, bearing means locating the inner and outer members for relative rotary movement with respect to one another, a lubricant reservoir, means for connecting the lubricant reservoir to the bearing means and pump means driven by relative rotary movement between the inner and outer annular members for pumping lubricant from the lubricant reservoir to the bearing means wherein the lubricant reservoir comprises a collapsible hose, and the pump means comprises means for effecting a peristaltic action in the hose as a result of relative rotary movement of the inner and outer annular member, thereby causing lubricant to be displaced from the hose towards the bearing means.

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**5,035,449**

## LOCK DEVICE FOR DOOR OF CARGO ROOM OF VEHICLE

**Naoki Shiratori, Yamanashi; Yoshiaki Ueda, Hiratsuka, and Isami Mitobe, Yokohama, all of Japan, assignors to Mitsui Kinzoku Kogyo Kabushiki Kaisha and Isuzu Motors Limited, both of Tokyo, Japan**

**Filed Feb. 22, 1990, Ser. No. 484,723**

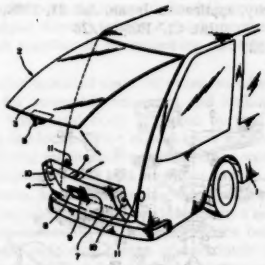
**Claims priority, application Japan, Feb. 22, 1989, 1-42569**

**Int. Cl.[5] E05C *3/06***

**U.S. Cl. 292—48** **2 Claims**

1. In a door device for a vehicle including:

an upper door disposed on a rear surface of a car body and fixed pivotally at an upper edge to said car body;
a lower door disposed on a rear surface of said car body and fixed pivotally at a lower edge to said car body;
a main lock member disposed at an upper edge of said lower door;
said main lock member having a spring returned latch and a spring returned ratchet for preventing the reverse rotation of said latch when said upper door is closed;
a main striker disposed at a lower edge of said upper door for engaging said main lock member;
a side lock member disposed on a right and left side of said lower door;
a side striker fixed on a right and left side of said car body for engaging said side lock member;
key operation means disposed on an outer surface of said lower door for releasing the engagement between said main lock member and said main striker thereby opening said upper door; and
a door opening handle disposed on the outer surface of said lower door for releasing the engagement between said side lock members and said side striker when said upper door is open;



the improvement wherein said spring returned latch of said main lock member is rotatably fitted by a first horizontal shaft parallel to the direction of the width of said car body;
said spring returned ratchet of said main lock member is rotatably fitted by a second horizontal shaft parallel to said first shaft;
said main striker is fixed to said upper door parallel to the direction of the width of said car body; and
said main lock member further comprising;
an open lever selectively engaged to said door opening handle for opening said side lock member;
an intermediate lever connected to said door opening handle;
said intermediate lever being rotatable on said open lever when said upper door is closed;
a connecting rod fixed at one end to said spring returned ratchet and slideably engaged at another end to said open lever;
said slideably engaged end of said connecting rod precluding rotation of said intermediate lever around said open lever when said upper door is open;
wherein said door opening handle can actuate said open lever and said intermediate lever to open said side lock member when said upper door is open.

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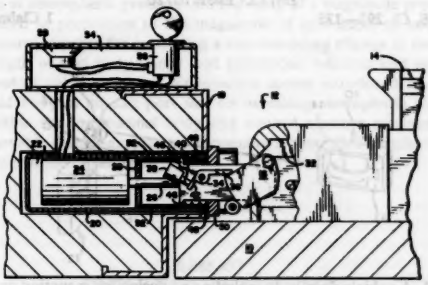
**5,035,450**

## DOOR EXIT-DELAYING MEANS

Peter H. Muller, Los Gatos, Calif., assignor to Von Duprin, Inc., Indianapolis, Ind.

Filed Feb. 23, 1990, Ser. No. 483,798
Int. Cl.[5] F05C *15/02*
U.S. Cl. 292—92 13 Claims

1. For mounting to a frame of a doorway, in which a door having a latchbolt-confining housing is mounted, means for engaging the latchbolt-confining housing of such door, for delaying exit via the door, comprising:
a support mountable to such frame of a doorway in confronting relationship to the latchbolt-confining housing of the door;
first means mounted to said support for (a) intrusion thereof



into said housing to prevent door movement, in a first disposition, and (b) withdrawal from said housing, in a second disposition, to permit door movement; and
second means mounted to said support operative in response to, and with a specific time delay following, a retraction of a housing-confined latchbolt into said housing for changing said first means from one of said dispositions thereof to the other.

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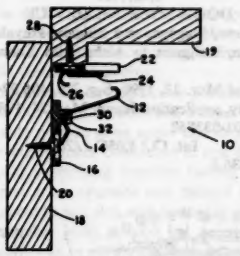
**5,035,451**

## DISTURBANCE RESPONSIVE MAGNETIC LATCH

Robert D. Brady, 921 Pigeon Point Rd., Pescadero, Calif. 94060

Filed Oct. 17, 1990, Ser. No. 600,189
Int. Cl.[5] E05C *19/02*
U.S. Cl. 292—96 18 Claims

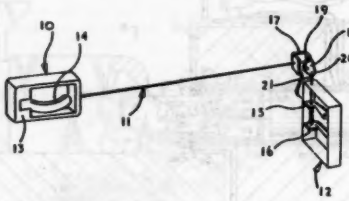


1. A disturbance responsive magnetic latch for selectively locking or unlocking a cabinet or other enclosure, comprising:
a first substantially planer mounting surface for engaging a face of said door,
a latch arm operably coupled to a pivot pin and having spring legs integral therewith and being coupled to said first planar mounting surface,
means for securing said first mounting surface to said cabinet or enclosure frame member,
a second mounting surface having a magnet coupled thereto and having retainer means in a normally non-latching relationship between said latch arm and said retainer means so that a disturbance or motion causes magnetic attraction to place the latch arm in a position to engage the retainer means when the door is moved to open, and
means for securing said second mounting surface to said cabinet or enclosure member.

## 5,035,452
## VEHICLE DOOR LATCHES

Wilfrid D. Rogers, Solihull, England, assignor to Bomoro, Bocklenberg & Motte GmbH & Co. KG, Wuppertal, Fed. Rep. of Germany

Filed Dec. 7, 1989, Ser. No. 447,240
Claims priority, application United Kingdom, Dec. 17, 1988, 8829527
Int. Cl.[5] E05B *65/20*
U.S. Cl. 292—125 1 Claim




1. A vehicle door latch including a housing for mounting on a vehicle door and having a release lever operable to release the latch mechanism and a locking lever having a locked position in which release of the latch mechanism is prevented; and a bell crank lever mounted on the housing and connected to the locking and release levers by a spring-loaded push/pull element, the push/pull element being arranged vertically and the bellcrank lever being movable from an unlocking position in one direction to pull the element to effect release of the latch mechanism and in the other direction to push the element to lock the latch mechanism, the bellcrank lever being provided with means for attachment of a cable for operation by the door handle, and the bellcrank lever being arranged for rotation about the axis of a pin extending between a support bracket attached to the latch housing and a holder for the bellcrank lever, which holder is formed with a recess within which a head on the pin is received.

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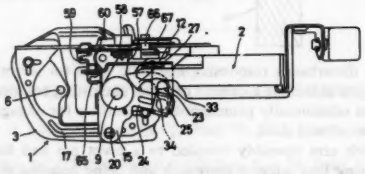
## 5,035,453
## DOOR-LOCKING DEVICE

Ryoichi Fukumoto, Nagoya, and Shigeru Hayakawa, Chiryu, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Aichi, Japan

Filed Mar. 22, 1990, Ser. No. 496,974
Claims priority, application Japan, Mar. 24, 1989, 01-033859; Mar. 24, 1989, 01-033860
Int. Cl.[5] E05C *3/26*
U.S. Cl. 292—336.3 3 Claims




1. A door-locking device comprising:
a main body accommodating therein a mechanism for opening and closing a door, said mechanism including a pawl member rotatably mounted on a pawl pin;
a base mounted on the main body;
a lift-lever rotatably mounted on the base for operating the opening and closing mechanism;
an outer-lever rotatably mounted on the pawl pin; for at times transmitting rotation to the lift lever;
a release member movably mounted on the outer-lever, said release member being engageable and disengageable with the lift lever for enabling and interrupting, respectively, the transmission of rotation of the outer-lever to the lift lever; and
an output lever rotatably mounted on an axis extending substantially perpendicular to the axis of the pawl pin; said output lever having a holding portion at an end therof extending substantially perpendicular to the axis of the paw pin connected to the release member for moving the release member into and out of engagement with the lift lever to enable and interrupt, respectively, the transmission of rotation by said outer-lever.

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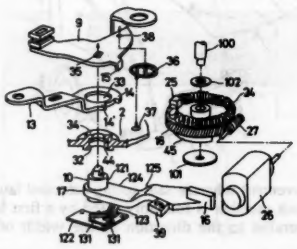
## 5,035,454
## DOOR LOCK DEVICE HAVING A CONDITION DETECTING SWITCH

Ryoichi Fukumoto, Nagoya; Shigeru Hayakawa, Chiryu; Nozomu Torii, Hekinan, and Souichiro Okudaira, Toyota, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Jul. 20, 1989, Ser. No. 382,757
Claims priority, application Japan, Jul. 21, 1988, 63-182293
Int. Cl.[5] E05C *3/26*
U.S. Cl. 292—337 4 Claims



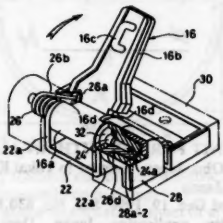

1. A door lock device comprising:
a main housing;
a pawl member rotatably mounted in the main housing for retaining a latch in a closed position;
a sub housing attached to the main housing;
a locking arm pivotably mounted to the sub housing for selectively being operated to a locked and unlocked position for locking and unlocking the pawl member in the retaining position;
a key handling lever mounted rotatably to the sub housing coaxially with the locking arm and having a protrusion engageable with the locking arm for rotating the locking arm to the locked and unlocked positions, in response to manipulation of a key;
a switch for detecting the locked and unlocked position of the locking arm, said switch including
a main body member including means attaching the main body member to the sub housing,
a switch arm element pivotally attached to the main body member at one end to pivot on an axis parallel to the axis of the locking arm and key levers and having another end with an axially extending pin in interfering relation with the locking arm and moveable therewith,
a first switch contact formed on a surface of the main body member, and
a second switch contact formed on the switch arm element disposed to physically engage and disengage the first switch contact in accordance with the locked and unlocked position of the locking arm.

5,035,455

## LOCK DEVICE FOR CASES

Mutsuo Kurosaki, Yokohama, Japan, assignor to Nifco, Inc., Yokohama, Japan

Filed Jul. 9, 1990, Ser. No. 550,268
Int. Cl.[5] E05C 21/00
U.S. Cl. 292—341.17 11 Claims




1. A lock device for a case having a body and a lid, comprising:

a latch member pivotably mounted upon one of said body and said lid of said case about a predetermined axis, and including a receiving means defined thereon;

means engaged directly with said latch member for biasing said latch member in an unlocking direction about said axis;

a lock member mounted upon the other one of said body and said lid for releasably receiving and locking said latch member when said body is closed by said lid and for retaining the locked state of said latch member;

a lock-releasing mechanism provided upon said lock member for unlocking said lock member; and

damper means, having projecting means mounted thereon, directly engaged with said latch member, a a result of said projecting means of said damper means being received within said receiving means of said latch member, for damping the biasing force of said biasing means in said unlocking direction of said latch member as said latch member pivots about said axis in said unlocking direction under the influence of said biasing force of said biasing means.

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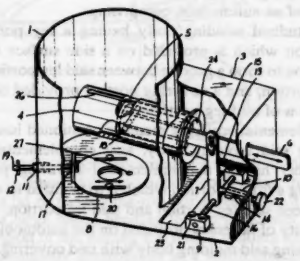
5,035,456

## VACUUM CONTROL SYSTEM FOR LIFTING SYSTEMS

Robert Messinger, 353 Circle Dr., Palmerton, Pa. 18071

Filed Mar. 29, 1990, Ser. No. 500,969
Int. Cl.[5] B66C 1/02
U.S. Cl. 294—64.1 8 Claims



1. In a vacuum powered lifting system, comprising, a vacuum source, a variable length longitudinal body, means for coupling said body to said vacuum source for selectively foreshortening the body in length in response to reduced air pressure in the body established by said source, lifting means adapted to grasp a work load object with the body to move the object vertically as a function of the foreshortening in length of the body, improved body length adjustment means for introducing variable quantities of air flow into the body to modify pressure established by said vacuum source, comprising in combination, a mechanism providing a substantially proportional movement of a control member for controlling of length of the body over a control range having uppermost vertical object position limits, and a single air control valve operable by said control member over said range for introducing a flow of air at atmospheric pressure into the body of a magnitude produced in proportion to the magnitude of movement of said control member for producing a corresponding change in the length of said body under load conditions, wherein said air control valve comprises air injection means introduced into said body at an exit port slot for releasing atmospheric air within the longitudinal body and control member actuated movable diaphragm means for opening a controlled length of the slot for releasing air.

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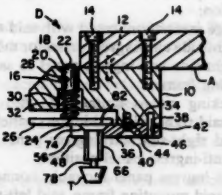
5,035,457

## SIMPLE TOOLING EXCHANGE

Gary L. Tvelt, Churchville, and Edward L. Nageldinger, Stanley, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 30, 1990, Ser. No. 559,785
Int. Cl.[5] B66C 1/42; B25J 15/00; B25G 3/00
U.S. Cl. 294—86.004 7 Claims




1. A device for exchanging tools of a simple type not requiring utility service, said device being adapted to facilitate coupling one such tool to, and uncoupling it from, a movable robotic arm, said device comprising:

a tool attaching member having a body portion attachable at a lower end thereof to the tool and a head portion wider than said body portion at an upper end thereof;

a tool supporting member connected at one end thereof to the arm, said supporting member having a slot therethrough open at an opposite end thereof and an upper surface adjacent to said slot, said slot being wider than said attaching member body portion but narrower than said head portion so as to receive said body portion therein with said head portion disposed thereabove for support by said adjacent upper surface;

a tool retaining member movably mounted to the arm above said supporting member, said retaining member including a stem extending longitudinally between top and bottom ends thereof and a flange extending transversely to said stem at said bottom end in overlying relation to said supporting member slot and upper surface, said retaining member being movable longitudinally toward and away from said slot and upper surface; and

means for resiliently biasing said retaining member toward said supporting member slot and upper surface, to thereby urge said retaining member flange into yieldable engagement with said attaching member head portion when said head portion is supported by said upper surface, and thus yieldably retain said attaching member on said supporting member.

**5,035,458**

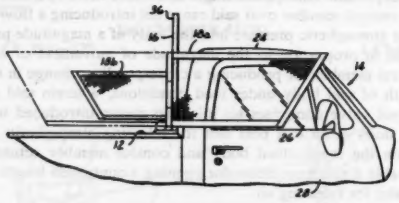
## ANTI-INGRESS SYSTEM FOR A MOTOR VEHICLE

**Robert G. Boensch, 3941 Bessinger Rd., AuGres, Mich. 48703**

**Filed Aug. 24, 1989, Ser. No. 398,087**

**Int. Cl.[5] B60R *25/00*; B60J *1/20***

**U.S. Cl. 296—1.1** **23 Claims**



1. An anti-ingress system for a motor vehicle, said motor vehicle having an occupant compartment, said occupant compartment having a right side, a left side, and a rear side, each of said right and left sides having at least one side door, each said side door having a side window, said anti-ingress system comprising:

a mounting frame having a left side and a right side;

mounting means connected with said mounting frame for mounting said mounting frame to the motor vehicle adjacent said rear side of said occupant compartment;

a right-side anti-ingress panel movably connected with said right side of said mounting frame, said right-side anti-ingress panel being movable from a first right-side anti-ingress panel position to a second right-side anti-ingress panel position;

right-side hinge means connected with said mounting frame and said right-side anti-ingress panel for movably connecting said right-side anti-ingress panel to said right side of said mounting frame;

right-side locking means connected with said mounting frame and said right-side anti-ingress panel for selectively locking said right-side anti-ingress panel in said second right-side anti-ingress panel position;

a left-side anti-ingress panel movably connected with said left side of said mounting frame, said left-side anti-ingress panel being movable from a first left-side anti-ingress panel position to a second left-side anti-ingress panel position;

left-side hinge means connected with said mounting frame and said left-side anti-ingress panel for movably connecting said left-side anti-ingress panel to said left side of said mounting frame; and

left-side locking means connected with said mounting frame and said left-side anti-ingress panel for selectively locking said left-side anti-ingress panel in said second left-side anti-ingress position;

said left-side and right-side anti-ingress panels being dimensioned so that when said mounting frame is mounted on said motor vehicle by said mounting means so that said right-side anti-ingress panel is located adjacent said right side of said occupant compartment and so that said left-side anti-ingress panel is located adjacent said left side of said occupant compartment, said right-side anti-ingress panel does not interfere with opening said at least one side door of said right side of said motor vehicle when said right-side anti-ingress panel is at said first right-side anti-ingress panel position but said right-side anti-ingress panel does interfere with opening said at least one side door of said right side of said motor vehicle and further said right-side anti-ingress panel prevents ingress into the occupant compartment through each side window of said at least one side door of said right side of said motor vehicle when said right-side anti-ingress panel is at said second right-side anti-ingress panel position, and said left-side anti-ingress panel does not interfere with opening said at least one side door of said left side of said motor vehicle when said left-side anti-ingress panel is at said first left-side anti-ingress panel position but said left-side anti-ingress panel does interfere with opening said at least one side door of said left side of said motor vehicle and further said left-side anti-ingress panel prevents ingress into the occupant compartment through each side window of said at least one side door of said left side of said motor vehicle when said left-side anti-ingress panel is at said second left-side anti-ingress panel position.

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**5,035,459**

## MOLDING UNIT FOR USE WITH AN AUTOMOBILE

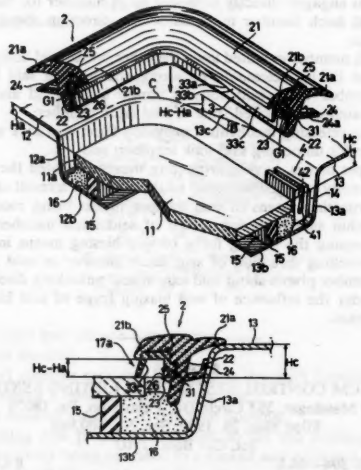
**Yukihiko Yada, Obu, Japan, assignor to Tokai Kogyo Kabushiki Kaisha, Obu, Japan**

**Filed Dec. 19, 1990, Ser. No. 630,199**

**Claims priority, application Japan, Dec. 25, 1989, 1-149120[U]; Dec. 25, 1989, 1-149121**

**Int. Cl.[5] B60J *10/02***

**U.S. Cl. 296—93** **10 Claims**





1. A molding unit for use on a window shield mounted on the body of an automobile, comprising:

a longitudinal molding body having a leg portion, a lip portion which is provided on a side surface of said leg portion to form a groove between said leg portion and said lip portion, and a covering portion provided on an upper portion of said leg portion;

a complemental covering member positioned longitudinally along said molding body, said complemental covering member having a complemental covering portion and having a fitting portion which is to be fitted to said groove between said leg portion and said lip portion; and

a plurality of fasteners provided on the automobile body for fastening said molding body with said covering member to the automobile body,

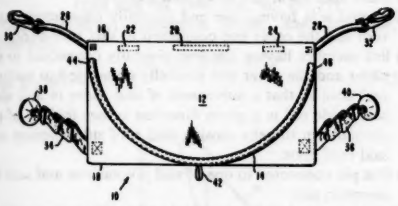
wherein an outside surface of the window shield is seated by said covering portion of said molding body at one portion thereof and is seated by said complemental covering portion of said complemental covering member at the other portion thereof when said molding body with said covering member is positioned along the window shield.

5,035,460

## AUTOMOBILE WINDOW PROTECTOR

En L. Huang, 1280 Price St., Pomona, Calif. 91767

Filed Oct. 13, 1989, Ser. No. 420,926
Int. Cl.[5] B60J 3/00
U.S. Cl. 296—95.1 24 Claims



1. A compactly foldable automobile window protector for a window of an automobile comprising:

a substantially planar quadrilateral sheet of at least one layer of a flexible first material, said sheet having front and back surfaces and having first and second opposed short sides and first and second opposed long sides;

an elongate curved strip of a spring-like, elastically deformable second material attached to said sheet, extending from near said first short side to near said second short side, and having a middle portion near a midpoint of said second long side, said curved strip and sheet being capable of being folded into a compact configuration;

retaining means attached to said sheet near a midpoint of said second long side, for retaining said protector in said compact configuration; and

a plurality of attachment means joined to said sheet for attaching said sheet to said automobile adjacent to said window.

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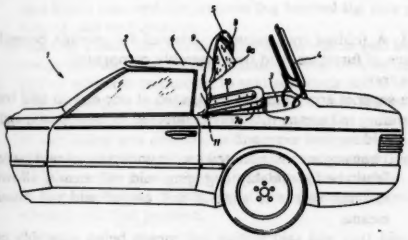
5,035,461

## FOLDING TOP FOR VEHICLES AND METHOD OF FOLDING

Gerhard Zweigart, Aidlingen, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed May 16, 1990, Ser. No. 523,880
Claims priority, application Fed. Rep. of Germany, May 16, 1989, 3915867
Int. Cl.[5] B60J 7/08
U.S. Cl. 296—107 1 Claim



1. A method for selectively stowing a vehicle folding top in a generally U-shaped folding-top box, comprising the steps of

opening a lid of the folding-top box arranged in a vehicle;

forming a large round-bending fold in the center of a rear wall region of the folding top with a bending axis extending substantially horizontally in a width direction of the vehicle;

drawing the round-bending fold into the folding-top box;

running the round-bending fold on a roll bar whose upper edge is located substantially above the level of the folding-top box in an intermediate position of the roll bar between a rest position and an erected protective position; and

running the round-bending fold on a directing edge which extends over a middle wall and portion of side walls of the folding-top box.

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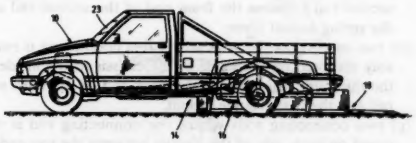
5,035,462

## UTILITY VEHICLE CHASSIS HAVING A VERTICALLY ADJUSTABLE BED

Robert L. G. Page, Sydney, and William J. Honan, Brisbane, both of Australia, assignors to Hynbrood Pty. Limited, Matraville, Australia

Filed Sep. 30, 1988, Ser. No. 252,189
Int. Cl.[5] B60P 1/02
U.S. Cl. 296—183 1 Claim



1. A vehicle chassis comprising:

(a) two side rail assemblies disposed substantially parallel to each other, each side rail assembly includes:

i. A first side rail having an upturned section near the front;

ii. a second side rail having an upturned back end that is connected by its front end to the back end of the first rail;

iii. a first brace disposed between the first and second side rails;

iv. a third side rail having an upturned front end that is connected to the upturned back end of the second side rail; and

v. a second brace disposed between the turned up portions of the second and third side rails;

(b) a bumper disposed across the front ends of the first rails;

(c) a torque box disposed across the back ends of the first rails;

(d) at least one cross member disposed across the first rails between the bumper and the torque box;

(e) a roll bar support assembly including:

i. a roll bar disposed above and across the torque box; and

ii. two support bars where one support bar is disposed between the roll bar and the front end of the third side rail on each side of the chassis;

(f) a front frame section defined by the bumper, two first side rails and the torque box that is adapted to receive and support a front suspension, motor, transmission and cab;

(g) a U-shaped back frame section defined by the torque box, roll bar support assembly, second side rails and third side rails that is adapted to receive an adjustable bed and rear suspension;

(h) two rear suspension support assemblies disposed on each side of the U-shaped back section between the upturned sections of the second and third side rails where each suspension support assembly includes:

i. a strut disposed between the second brace and the connection between the second and third side rail;

ii. a leaf spring mounting plate disposed on the second rail;

iii. a trailing arm mounting plate disposed on the second rail between the spring mounting plate and the strut;

iv. a shock mounting plate disposed between the strut and the third side rail; and

v. a first shackle rotatably connected at one end to the third side rail;

(i) two leaf springs each having a centrally disposed shackle mount, where one leaf spring is disposed on each side of the chassis between the spring mounting plate and the first shackle;

(j) two trailing arm assemblies each having an arm and an

axle mount flange disposed at one end of the arm where one trailing arm is rotatably disposed on each side of the chassis to the trailing arm mount by the end opposite the axle mount flange;

(k) two second shackles where one second shackle is disposed on each side of the chassis between the leaf spring shackle mount and the axle mount end of the trailing arm;

(l) two second stage springs where one spring is disposed on each side of the chassis to the bottom the strut;

(m) two shocks where one shock is disposed on each side of the chassis between the shock mounting plate and axle mount end of the trailing arm;

(n) two first boomerangs where one boomerang is rotatably disposed on each side of the chassis to the inside of the second rail between the front end of the second rail and the spring mount plate;

(o) two second boomerangs where one boomerang is rotatably disposed on each side of the chassis to the inside of the third side rail between the back end of the third side rail and the first shackle mount;

(p) two connecting rods where one connecting rod is disposed on each side of the chassis between the top end of the first and second boomerangs;

(q) two hydraulic cylinders where one cylinder is disposed on each side of the chassis and pivotally connected at one end to the frame and at the other end to the top portion of the first boomerang;

(r) a means for actuating the hydraulic cylinders;

(s) a bed assembly rotatably connected to the bottom end of each boomerang;

(t) a tail gate assembly rotatably connected to the back end of the adjustable bed;

(u) a bed locking assembly including:

i. a plurality of latch plates where latch plates are disposed on each side of the chassis to the third side rail;

ii. a plurality of bobbins adapted to engage each latch plate;

iii. two guide rods rotatably connected at one end to the bobbin and rotatably connected at the other end to the latch plate in sliding relation; and

iv. a means for locking the tail gate to the frame.

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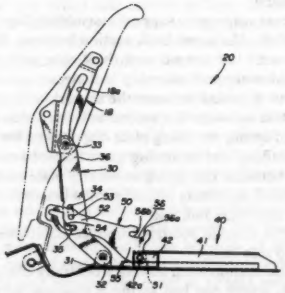
**5,035,463**

## ROOF DOOR DEVICE OF MOTOR VEHICLE

**Yuichi Kato, Yokohama; Hiroshi Yoshida, and Kozo Mizusawa, both of Chigasaki, all of Japan, assignors to Ohi Seisakusho Co., Ltd., Yokohama, Japan**

**Filed Sep. 21, 1990, Ser. No. 585,989**
**Claims priority, application Japan, Sep. 26, 1989, 1-249988**
**Int. Cl.[5] B60J 7/19**
**U.S. Cl. 296—223** **17 Claims**




1. In a motor vehicle having a roof and a side door operable to close a side door opening,

a roof door device comprising:

first means defining in said roof a roof side opening which is positioned above said side door opening;

a roof door pivotally connected to said roof to open and close said roof side opening;

a guide rail mounted on said roof at a position near said roof side opening;

a slider slidable in and along said guiderail ;

a pivotal arm having one end pivotally connected to said roof and the other end connected to said roof door;

a link member having one end pivotally connected to said slider and the other end pivotally connected to said pivotal arm, so that a movement of said slider in and along said guide rail in a given direction causes folding of said pivotal arm thereby closing said roof side opening with said roof door;

a first pin connected to one of said pivotal arm and said link member; and

second means defining in the other of said pivotal arm and said link member a holding recess, said holding recess catching said first pin to achieve a latched condition of said pivotal arm relative to said link member when said pivotal arm is folded to lie parallel with said link member.

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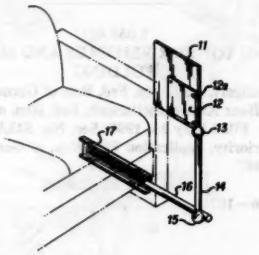
**5,035,464**

## SNACK TRAY ASSEMBLY

**Howard Spallholtz, 95 16th St., West Babylon, N.Y. 11704**

**Continuation-in-part of Ser. No. 416,407, Oct. 3, 1989, abandoned. This application Apr. 3, 1990, Ser. No. 503,773**
**Int. Cl.[5] A47C 7/62**
**U.S. Cl. 297—144** **3 Claims**




1. A folding tray assembly adapted for storage beneath a piece of furniture, said tray assembly comprising:

a tray;

a support arm rotatably connected at one end to said tray;

sliding rail means rotatably connected to an opposite end of said support arm; and

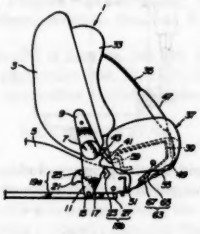
rail housing means mounted on the underside of said piece of furniture for slidably engaging said rail means, allowing said rail means to slide in and out of said rail housing means;

said tray and said sliding rail means being rotatably connected to said support arm at opposite ends by unitary joints, each unitary joint having two axes of rotation substantially normal to one another and comprising a hollow spherical socket and a spherical ball disposed within said spherical socket, one said ball having said arm attached to it and the other said ball having said tray attached to it, each said spherical socket having a double legged slot disposed therethrough to provide a pathway for said arm and said tray to follow such that said tray assembly can be unfolded to an upright position and folded into a compact configuration for storage beneath said piece of furniture.

## 5,035,465
## VEHICULAR INFANT SAFETY SEAT WITH SEAT BACK SAFETY STOPPER

**Toshimichi Hanai, Yokosuka; Hideyuki Nagashima, Yokohama, and Yasuyuki Fujita, Akishima, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama and Tachi-S Co., Ltd., Tokyo, both of, Japan**

**Filed Aug. 10, 1989, Ser. No. 391,771**
**Claims priority, application Japan, Aug. 25, 1988, 63-110591[U]**
**Int. Cl.[5] B60N 1/12**
**U.S. Cl. 297—238** **15 Claims**



1. A vehicular seat, comprising:
a seat cushion, said seat cushion including a seat cushion frame having a portion which extends across the rear of said seat cushion proximate a rear edge thereof;
a seat back support mechanism, said seat back support mechanism being mounted on said seat cushion frame;
a seat back, said seat back being movably supported by said seat back support mechanism so as to be movable between a first position wherein the seat can be occupied and a second position wherein the seat back is angled forward over the seat cushion; and
an infant seat comprising:
an infant back support, said infant back support being disposed on a back side of said seat back;
a seat back frame included in said seat back;
an infant seat cushion structure;
means for detachably connecting said infant seat cushion structure to said seat back frame;
said infant seat cushion structure being supported on the seat back in a manner wherein a rear edge thereof which juxtaposes the seat back is engageable with an upper rear portion of said seat cushion and wherein a main portion of said infant seat cushion projects out beyond the rear portion of said seat cushion;
restraining means for restraining an infant within said infant seat, said restraining means including a seat belt, an upper end of which is connected to said seat back and a lower end of which is connected to the seat cushion frame; and
a stopper, said stopper being rigidly connected to a rear edge of said infant seat cushion, said stopper being arranged to abut against the rear portion of said seat cushion frame which extends proximate the rear of said seat cushion and to stop movement of seat back from said second position toward said first position.

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## 5,035,466
## ERGONOMIC CHAIR

**Marty K. Mathews, Rhinelander, Wis., and Jeffrey A. Weber, Minneapolis, Minn., assignors to Krueger International, Inc., Green Bay, Wis.**

**Filed Apr. 3, 1989, Ser. No. 332,796**
**Int. Cl.[5] A47C 1/02**
**U.S. Cl. 297—337** **22 Claims**

1. A chair comprising:
a seat support member;
a backrest support member; and
a base member to which said seat support member and said backrest support member are attached, said base member including:
first means engaging said seat support member for permitting sliding, generally horizontal movement of said seat support member between a forward seated position and a rearward seated position relative to said base member; and

second means engaging said backrest support member for permitting sliding, generally horizontal movement of said backrest support member toward and away from said base member, independent of the movement of said seat support member.

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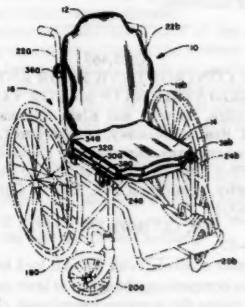
## 5,035,467
## SEATING SYSTEM

**Peter Axelson; Michael Heinrich, both of Santa Cruz; Ann Lasko-Harvill, Palo Alto, all of Calif., and Michael W. Silverman, Highland Park, Ill., assignors to Pin Dot Products, Niles, Ill.**

**Filed Sep. 15, 1988, Ser. No. 244,843**
**Int. Cl.[5] B60N 1/02; A47C 1/12**
**U.S. Cl. 297—440** **22 Claims**



1. A seating system adapted for secure mounting to and easy removal from a support base, said seating system comprising:
a seat assembly having a first internal support frame disposed within a seat cushion, said seat assembly further including first mounting means coupled to said first internal support frame and extending out of said seat cushion for securely coupling said seat assembly to the support base;
a back assembly having a second internal support frame disposed within a back cushion, said base assembly further including second mounting means coupled to said second internal support frame and extending out of said back cushion for securely coupling said back assembly to the support base; and

coupling means for pivotally coupling said seat and back assemblies for allowing the seating system to assume a compact, folded configuration when removed from the support base, said coupling means including handle means to permit secure gripping of the seating system and facilitate its transport.

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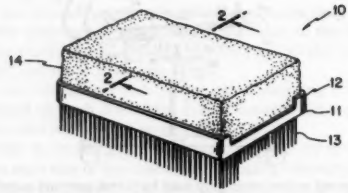
**5,035,468**

## SURGICAL SCRUB BRUSH

**James Brown, 690 Bedford Rd., Armonk, N.Y. 10549, and Jack W. Kaufman, 357 Frankel Blvd., Merrick, N.Y. 11566**

**Filed May 11, 1990, Ser. No. 522,677**
**Int. Cl.[5] A46D *3/00***
**U.S. Cl. 300—21** **19 Claims**




1. A method for assembling a scrub brush having a plurality of bristles integrally on one side of a thermoplastic backing and an open-cell organic sponge bonded to the other side of the thermoplastic backing comprising the steps of:

a) forming a thermoplastic brush with integral bristles oriented primarily perpendicular to a backing;

b) melting a plurality of protrusions on the side of the backing away from the bristles by heating the protrusions from about 0.1 to about 5 seconds;

c) placing the sponge on the molten protrusions with minimal pressure; and

d) maintaining contact between the molten protrusions and the sponge without heating; whereby the molten protrusions migrate by capillarity sufficiently into the stroma network of the sponge to form a firm assembly without the use of adhesives.

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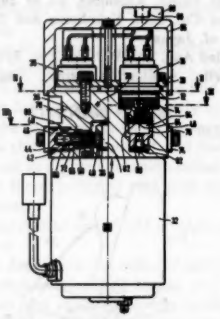
**5,035,469**

## PRESSURE CONTROL DEVICE FOR ANTI-LOCK OR ANTI-SKID SYSTEMS IN MOTOR VEHICLES

**Herman J. Geilen, Mendig, and Klaus Glasmacher, Boppard, both of Fed. Rep. of Germany, assignors to Lucas Industries public limited company, Birmingham, England**

**Filed Dec. 27, 1989, Ser. No. 457,448**
**Claims priority, application Fed. Rep. of Germany, Jan. 23, 1989, 8900706[U]**
**Int. Cl.[5] B60T *8/32, 13/16***
**U.S. Cl. 303—87** **3 Claims**

1. In a pressure control device for anti-lock brake system for motor vehicles comprising a housing, at least one pump chamber in said housing for a return pump, said chamber having inlet and outlet connections, a master cylinder connection, and a wheel brake cylinder connection in said housing, a first valve chamber in said housing for a first normally open control valve connecting said master cylinder and wheel brake cylinder connections, a second valve chamber in said housing for a second normally closed control valve, a storing chamber and a damping chamber in said housing, said second normally closed control valve being moved to an open position in response to skidding conditions to connect said wheel brake connection to said storing chamber, said storing chamber to the inlet connection of said return pump and the outlet connection of said return pump to said damping chamber, the invention wherein said damping chamber is arranged in an extension of said first valve chamber and said storing chamber is arranged in an extension of said second valve chamber, and wherein the outlet



connection of said return pump includes a pressure valve which is also arranged in said first valve chamber.

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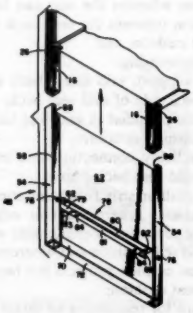
**5,035,470**

## SIDE PANEL CONVERSION KIT FOR A DESK

**Regis R. Miller, Burlington, N.J., assignor to Stylex, Inc., Delanco, N.J.**

**Filed Nov. 13, 1989, Ser. No. 435,160**
**Int. Cl.[5] A47B *41/00***
**U.S. Cl. 312—195** **17 Claims**



1. A side panel conversion kit for a pedestal desk of the type having a pedestal and spaced legs which are connected to the desk by adjustable screw-like fasteners comprising

a side panel assembly for overlying said pedestal, said side panel assembly including an outer portion and an inner portion, said outer portion having an outer surface, an inner surface and lateral edges, said outer portion including a first part for lying alongside said pedestal, and a second part for lying below said pedestal,

elongated leg connection means coupled to said inner surface at said lateral edges, said elongated leg connection means being hollow to slidably receive said desk legs so that said side panel assembly is supported by said desk legs with said first part disposed adjacent said pedestal and said second part disposed below said pedestal,

said inner portion for being disposed along the inner surface of the second part of said outer portion,

means for supporting said inner portion, said means for supporting said inner portion comprising a first member disposed along the lower edge of said outer portion and a second member fixed to said inner surface of said outer portion in spaced relation to said first member, and

said inner portion is dimensioned to fill the space defined by said elongated leg connection means and said first and second members.

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**5,035,471**

## SAFETY ARRANGEMENT FOR OVERHEAD LUGGAGE BINS IN AIRCRAFT PASSENGER CABINS

**David Ackerman, Pulham, Nr Dorchester, United Kingdom, assignor to Bridport Aviation Products Limited, Bridport, England**

**Continuation-in-part of Ser. No. 365,780, Jun. 14, 1989, abandoned. This application Dec. 22, 1989, Ser. No. 454,851**

**Claims priority, application United Kingdom, Jun. 22, 1988, 8814865**

**Int. Cl.[5] A47B *81/00***

**U.S. Cl. 312—291** **9 Claims**

1. An aircraft cabin luggage bin having wall panel means fixed to the structure of the aircraft cabin and defining a load carrying interior with a floor and having the general shape of a box; said box having a laterally elongate frontal access opening and a front door panel which is openable to uncover, and closable to cover, said opening; said door panel having an upper generally horizontal edge and being hinged at a location adjacent its said upper edge to said bin, and on which said front door panel pivots outwardly and upwardly, on opening to uncover said frontal access opening of the bin; said door having a generally horizontal lower edge adjacent said luggage bin floor along a sill defining the lower boundary of said frontal access opening of said bin; and said door having positive self-latching catch means located at its said lower edge which, when said door is in closed position, lockingly engages with positive keep means affixed to said bin adjacent said sill; said luggage bin being further characterized by the following features all in combination;

a) visor means behind the upwardly and outwardly pivoting front door panel of said bin; said visor means constituting a temporary physical barrier, which when closed, masks at least the lower half of the access opening which is uncovered when the front closure door panel of the bin is opened;

b) said visor means being pivotally connected to said bin and including a plurality of hinged upwardly and outwardly pivoting transparent part-visors, each of which has independent visor catch means which are required individually to be released before the part-visor can be raised;

c) each of said part-visors having a generally horizontal lower edge cooperating with said luggage bin sill, defining the lower boundary of said frontal access opening of said bin;

d) said visor catch means being located at said lower edge of each said part-visor and having a movable latching member which, when said part-visor is in closed position, lockingly engages with a visor keep means affixed to said bin adjacent said sill;

e) each said visor catch means being self-latching when said part-visor is closing; and each said visor catch means requiring operation by hand to unlatch by releasing said movable latching member from locking engagement with said visor keep means affixed adjacent to said bin sill, before the part-visor can be moved from closed position towards its open position.

f) and wherein said self-latching catch means on said front door panel and on each of said part-visors, respectively, together with their respective associated keep means, are all operatively independent on one another, at least during unlatching.

**5,035,472**

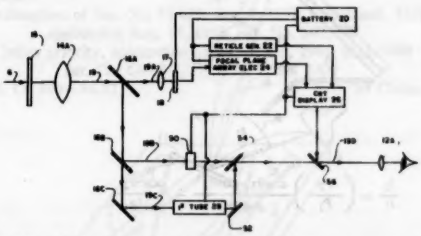
## INTEGRATED MULTISPECTRAL MAN PORTABLE WEAPON SIGHT

**Charles L. Hansen, Fort Belvoir, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Jun. 20, 1990, Ser. No. 540,733**

**Int. Cl.[5] G02B *23/12*; F41G *1/38***

**U.S. Cl. 350—1.1** **12 Claims**




1. A multispectral sight apparatus integrated onto a man portable type weapon for use in viewing a scene in all ambient light level conditions, said apparatus comprised of:

common objective optics for collecting incoming radiant energy from a variable light level scene and common eyepiece optics along a common eyepiece optical axis for viewing the scene;

a plurality of multispectral optical and electrical elements, said elements comprised of at least three distinct spectrum channels having optical parallel paths between said common objective optics and eyepiece optics wherein each of said at least three distinct spectrum channels process a distinct spectrum of radiant energy therein, a plurality of radiant energy routing optical devices for collecting and separating input radiant energy into each of said at least three distinct spectrum channels and recombining the outputs of said channels along said common eyepiece optical axis, and a processing means comprised of a battery power source and separate processing means in each of said at least three distinct spectrum channels for processing the radiant energy therein;

means for selectively activating each of the at least three processing means according to the ambient light level of said scene being viewed in which said multispectral sight apparatus selectively operates in the visible spectrum for daylight viewing, in the near infrared spectrum for twilight viewing, and in the far infrared spectrum for viewing in total darkness; and

a unitary housing means for containing said common objective optics and eyepiece optics and said plurality of multispectral optical and electrical elements within a housing and having said means for activating said processing means on the exterior of said housing.

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**5,035,473**

## DISPLAY APPARATUS

**Tetsuro Kuwayama, Yokohama; Naosato Taniguchi, Atsugi; Yoko Yoshinaga, Machida, and Nobuo Kushibiki, Yamato, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed May 23, 1989, Ser. No. 355,347**

**Claims priority, application Japan, May 25, 1988, 63-125957**

**Int. Cl.[5] G02B *5/32***

**U.S. Cl. 350—3.7** **17 Claims**

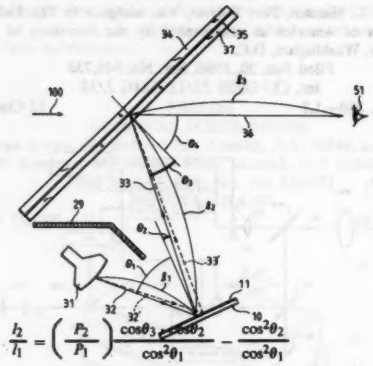
1. A display apparatus, comprising:

a display unit for emitting light;

a first diffraction grating for causing light from said display unit to be diffracted; and

a second diffraction grating for causing the light diffracted by said first diffraction grating to be diffracted and directing it toward a pupil of an observer,

wherein said apparatus satisfies the following condition;



$$\frac{l_2}{l_1} = \left(\frac{P_2}{P_1}\right)\frac{\cos\theta_3}{\cos^2\theta_1} - \frac{\cos^2\theta_2}{\cos^2\theta_1}$$

where $l_1$ is a distance between said display unit and said first diffraction grating, $l_2$ is a distance between said first diffraction grating and said second diffraction grating, $P_1$ is a grating pitch of said first diffraction grating, $P_2$ is a grating pitch of said second diffraction grating, $\theta_1$ is an incident angle of the light on said first diffraction grating, $\theta_2$ is an exit angle of the light from said first diffraction grating, and $\theta_3$ is an incident angle of the light on said second diffraction grating.

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**5,035,474**

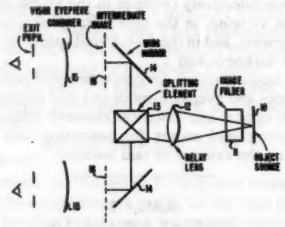
## BIOCULAR HOLOGRAPHIC HELMET MOUNTED DISPLAY

**Gaylord E. Moss, Marina Del Rey; Brian D. Cohn, El Segundo; Mao-Jin J. Chern, Rancho Palos Verdes; Lacy G. Cook, Hawthorne, and John J. Ferrer, Los Angeles, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Continuation of Ser. No. 319,914, Feb. 22, 1989, abandoned, which is a continuation of Ser. No. 600,636, Apr. 16, 1984, abandoned. This application Aug. 1, 1990, Ser. No. 563,897**

**Int. Cl.[5] G02B *5/32, 27/10***

**U.S. Cl. 350—3.7** **18 Claims**



1. Biocular display apparatus for mounting on a helmet to provide biocular images from a single object source combined with external scenes received through a helmet visor comprising:

an object source device to be mounted adjacent the helmet for providing a downwardly directed display along the forward portion of the helmet;

an X-cube prism for splitting incident light from the object source device into a pair of oppositely directed traverse beams, said X-cube prism having internal surfaces which are partially reflective and partially transmissive to develop the transverse beams from incident light at one external face of the prism;

a substantially transparent visor for mounting on said helmet and having dual eyepieces oriented at a selected angle, said eyepieces being substantially transparent to permit the helmet wearer to view external scenes therethrough and comprising diffraction optical means for diffracting light directed thereto from the object source device to project collimated biocular images at respective exit pupils in the vicinity of the helmet wearer's eyes;

means between the object source device and the X-cube prism for directing light from the object source to the X-cube prism; and

fold means adjacent the X-cube prism for directing the two light beams from the X-cube prism toward the respective eyepieces, and

wherein said object source device, said X-cube prism, said light directing means and said fold means are arranged above the helmet wearer's eyes and generally in the region of the wearer's forehead such that each light ray incident on an eyepiece from the object source device and the corresponding light ray diffracted from the eyepiece toward the corresponding exit pupil define a generally vertical plane.

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**5,035,475**

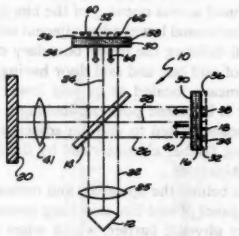
## UNIQUE MODULATION TELEVISION

**Yeon H. Lee, Los Angeles, and Gregory Um, Torrance, both of Calif., assignors to Aura Systems, Inc., El Segundo, Calif.**

**Filed Mar. 15, 1990, Ser. No. 478,139**

**Int. Cl.[5] G02B *26/08***

**U.S. Cl. 350—6.5** **24 Claims**



1. An optical modulation video system to display an image as an M×N array of pixels, said system comprising:

a source of optical energy to develop a first light beam along a first propagation path;

a beam splitter disposed in said first propagation path and positioned to split said optical energy of said first light beam to develop a second light beam along a second propagation path;

a first baffle having a first face, a second face, and N columns of slits open between said first face and said second face, said baffle being disposed in said second propagation path so that said second light beam illuminates said first face and passes through said slits to exit from said second face as a plurality of planar light beams along said second propagation path;

an M×N array of first mirrors disposed in a facing relationship to said second face of said baffle, each column of said mirrors having an optically reflective surface in optical alignment with a respective one of said slits to reflect one of said planar light beams incident thereon through said respective one of said slits to develop a plurality of pixel light beams exiting said slits from said first face along said second propagation path, each of said mirrors being movable to perturb a respective one of said pixel light beams propagating therefrom from alignment with said second propagation path to attenuate selectively said optical energy of said respective one of said pixel beams when propagating through said respective one of said slits; and

a screen disposed in said second propagation path and positioned wherein said beam splitter is intermediate said

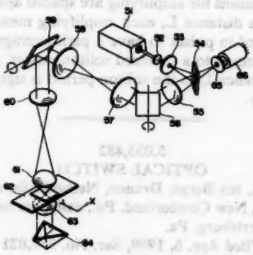
baffle and said screen, whereby said pixel beams illuminate said screen to display said image.

5,035,476

## CONFOCAL LASER SCANNING TRANSMISSION MICROSCOPE

Gordon W. Ellis, Media, Pa., and Koji Ichie, Hamamatsu, Japan, assignors to Hamamatsu Photonics K.K., Hamamatsu, Japan

Filed Jun. 15, 1990, Ser. No. 538,526
Int. Cl.[5] G02B *26/10*
U.S. Cl. 350—6.5 2 Claims



1. A confocal laser scanning transmission microscope including a deflecting element for deflecting a light beam at a set scanning frequency in a main scanning direction and an auxiliary scanning direction perpendicular to the main scanning direction to irradiate the light spot to a specimen, the microscope comprising:

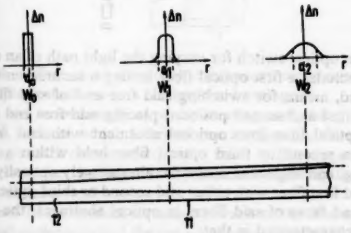
an infinity compensating objective lens for collecting a light beam transmitted through the specimen to form into a parallel beam; and a cube-corner-reflector disposed on the opposite side of the specimen across the infinity compensating objective lens and on the exit pupil position of the infinity compensating objective lens.

5,035,477

## METHOD OF CHANGING THE SPOT DIAMETER OF SINGLE-MODE STEP-INDEX FIBERS, AND SINGLE-MODE FIBER COUPLING UNIT MADE BY SAID METHOD

Dieter Schlump, Stuttgart, Fed. Rep. of Germany, assignor to Alcatel N.V., Amsterdam, Netherlands

Filed Aug. 24, 1989, Ser. No. 398,777
Claims priority, application Fed. Rep. of Germany, Aug. 25, 1988, 3828814
Int. Cl.[5] G02B *6/16*
U.S. Cl. 350—96.3 6 Claims



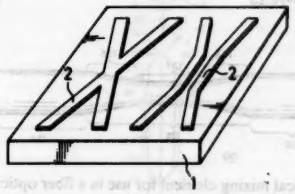

5. Single-mode fiber coupling unit comprising a single-mode step-index fiber section of a given length and having a core surrounded by a cladding, whose associated spot diameter varies approximately linearly over the length of the section, wherein the product of the effective diameter of the fiber core times the normalized difference of the refractive indices of the core and the cladding is approximately constant.

5,035,478

## MATERIAL FOR MICRO OPTICAL COMPONENT AND OPTICAL COMPONENT USING THE SAME

Akira Ishikawa, Kokubunji; Yukio Ito, Sayama; Hiroshi Okamoto, Oume; Tetsuichi Kudo, Tokyo, and Katsuki Miyauchi, Hino, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 93,629, Sep. 8, 1987, abandoned. This application Aug. 14, 1990, Ser. No. 567,706
Claims priority, application Japan, Sep. 8, 1986, 61-209449
Int. Cl.[5] G02F *1/17, 1/23;* C09K *3/00*
U.S. Cl. 350—96.12 39 Claims




1. An optical wave guide for an optical integrated circuit, said optical wave guide including a thin film comprising polytungstic acid having peroxo groups ($O_2^{2-}$), said thin film being disposed on a substrate and constituting a light path for said optical integrated circuit.

26. An optical wave guide as claimed in claim 1, wherein the optical wave guide is a lens, said lens being composed of said thin film of polytungstic acid having peroxo groups ($O_2^{2-}$).

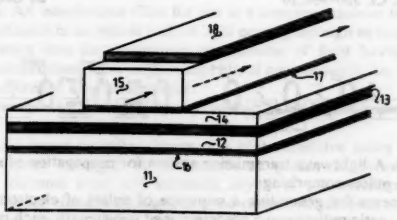
27. An optical wave guide as claimed in claim 1, wherein the optical wave guide is a prism, said prism being composed of said thin film of polytungstic acid having peroxo groups ($O_2^{2-}$).

5,035,479

## DEVICE FOR OPTICAL SIGNAL PROCESSING SHOWING TRANSISTOR OPERATION

Roger A. Vounckx, Brussel, Belgium, assignor to Interuniversitair Micro-Elektronica Centrum vzw, Leuven-Heverlee, Belgium

PCT No. PCT/EP89/00693, § 371 Date Apr. 4, 1990, § 102(e) Date Apr. 4, 1990, PCT Pub. No. WO89/12843, PCT Pub. Date Dec. 28, 1989
PCT Filed Jun. 19, 1989, Ser. No. 469,591
Claims priority, application Netherlands, Jun. 17, 1988, 8801561
Int. Cl.[5] G02B *6/10*
U.S. Cl. 350—96.14 8 Claims




1. A device for optical signal processing comprising:

a substrate;

a waveguide of doped semiconductor material on top of the

substrate, the waveguide having a refractive index which is not greater than the refractive index of the substrate;

a junction region between the waveguide and the substrate; and

a gate for receiving an electric potential with respect to the substrate is positioned on top of the waveguide, whereby the passage of light through the waveguide in a direction parallel to the junction region is controllable by the application of an electrical potential to the gate.

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**5,035,480**

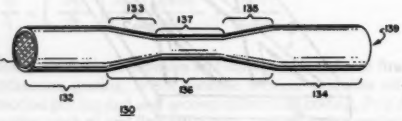
**STAR-COUPLERS WITH BICONICAL MIXING ELEMENTS AND METHODS FOR MAKING THE SAME**

**Bulusu V. Dutt, Yorktown Heights, N.Y., assignor to Codenoll Technology Corporation, Yonkers, N.Y.**

**Filed Sep. 6, 1989, Ser. No. 403,551**

**Int. Cl.[5] G02B *6/26***

**U.S. Cl. 350—96.15** **7 Claims**




1. A biconical mixing element for use in a fiber optic coupler comprising:

(a) an input end having a generally circular cross section;

(b) a first tapered region in communication with said input end and having a generally circular cross section;

(c) a central region in communication with said first tapered region and having a generally circular cross section;

(d) a second tapered region in communication with said central region and having a generally circular cross section;

(e) an output end in communication with said second tapered region and having a generally circular cross section, said input and output ends each having a diameter greater than a diameter of said central region; and

(f) a cladding layer surrounding at least said first tapered region, said central region, and said second tapered region, said cladding layer having a lower index of refraction than said first, second and central regions, so as to guide and confine light in said regions,

wherein optical energy input to said input end is uniformly mixed in said tapered regions and said central region and uniformly output from said output end so as to minimize port-to-port deviation.

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**5,035,481**

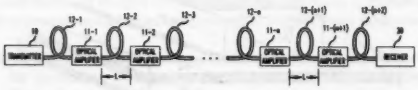
**LONG DISTANCE SOLITON LIGHTWAVE COMMUNICATION SYSTEM**

**Linn F. Mollenauer, Colts Neck, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Aug. 23, 1990, Ser. No. 571,963**

**Int. Cl.[5] G02B *6/28, 6/02;* H04J *1/00;* G02F *1/00***

**U.S. Cl. 350—96.16** **21 Claims**




1. A lightwave transmission system for propagation of soliton pulses comprising:

means for generating a sequence of pulses of electromagnetic radiation at a predetermined wavelength, each pulse having a pulse width $\tau$;

a single mode optical fiber having anomalous group velocity dispersion in a spectral region that includes the predetermined wavelength, the optical fiber exhibiting substantially equal path average group velocity dispersion for each successive path of length $L_D$ along the optical fiber;

means for coupling the sequence of pulses into the optical fiber at an input location, the coupled-in pulses being of the type for forming fundamental solitons in the optical fiber wherein the solitons exhibit a soliton period $z_0$ related to both the pulse width $\tau$ and the path average group velocity dispersion, the coupled-in pulses propagating through the optical fiber from the input location to an output location; and

a plurality of means for amplifying the coupled-in pulses at predetermined, locations along the optical fiber intermediate the input location and the output location wherein adjacent means for amplifying are spaced apart from each other by a distance L, each amplifying means increasing the coupled-in pulses to have a path average power substantially equal to a standard soliton power, and the ratio of the distance L to the soliton period is significantly less than unity.

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**5,035,482**

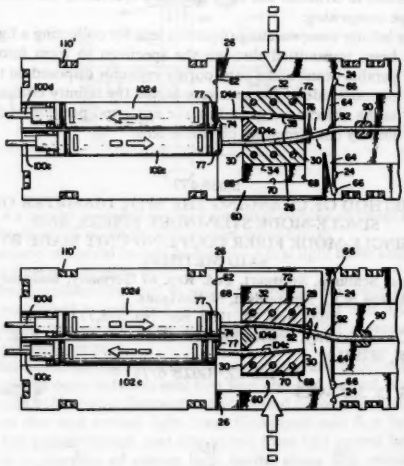
**OPTICAL SWITCH**

**Eduardus F. A. ten Berge, Drunen, Netherlands, and Gerardus M. van Alst, New Cumberland, Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed Apr. 6, 1989, Ser. No. 334,021**

**Int. Cl.[5] G02B *6/36***

**U.S. Cl. 350—96.20** **19 Claims**




1. An optical switch for varying the light path of an optical fiber includes a first optical fiber having a secured end and a free end, means for switching said free end of said fiber between first and second positions placing said free end of said first optical fiber into optional abutment with end faces of either a second or third optical fiber held within a switch housing, and alignment means for alternatively optically aligning said first fiber with either said second or third optical fiber with end faces of said fibers in optical abutment, the switch being characterized in that:

said second and third optical fibers include an exterior coating formed by a metallic plated material providing a resilient fiber end, said alignment means includes two V-grooves within said switch housing facing each other with said first optical fiber disposed in the space between said

two facing V-grooves, said switching means being operable to move said first fiber between said two facing V-grooves into optical abutment with either said first or second fiber, said resiliency in said second and third fiber ends spring loading at least a portion of said plated fiber ends of said second and third fibers within and against a portion of said respective V-groove providing precise alignment of said two abutting optical fiber ends.

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5,035,483

## SURFACE-MOUNTABLE OPTO-COMPONENT

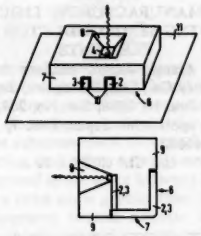
Guenter Waitl, and Franz Schellhorn, both of Regensburg, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed May 31, 1990, Ser. No. 531,470

Claims priority, application European Pat. Off., May 31, 1989, 89109834.5

Int. Cl.[5] G02B 6/42

U.S. Cl. 350—96.20 12 Claims



10. A surface-mountable opto-component, comprising:

an opto-transducer in a rectangular housing;

first and second surfaces of the housing comprising mounting surfaces which intersect one another and form a 90° angle with one another, and a third surface opposite the first surface having a cavity therein containing the opto-transducer; and

at least two electrical terminals at each of the first and second surfaces so that the opto-component can be optionally surface mounted as a top-viewer for light entering or exiting at the top when mounted on the first surface and as a side-viewer for light entering or exiting at the side when mounted on the second surface.

5,035,484

## METHOD AND APPARATUS FOR PRODUCING COATED OPTICAL FIBER

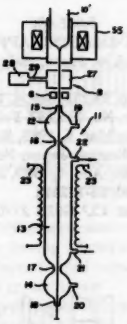
Yoichi Ishiguro; Masaharu Ooe; Kohei Kobayashi; Gotaro Tanaka, and Minoru Watanabe, all of Yokohama, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Dec. 21, 1989, Ser. No. 452,823

Claims priority, application Japan, Dec. 21, 1988, 63-322539; Dec. 27, 1988, 63-330470; Jul. 5, 1989, 64-173327; Nov. 10, 1989, 293026

Int. Cl.[5] G02B 6/10, 6/00; B05D 5/12; B21C 37/00

U.S. Cl. 350—96.30 2 Claims



1. An $SiO_2$ based glass optical fiber, a peripheral surface of which is coated with a carbon layer wherein a carbon atom in the carbon layer and the silicon oxide of the optical fiber are not chemically bonded with one another.

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5,035,485

## INTERFERENCE FILTER WITH SHARP CUTOFF CHARACTERISTICS

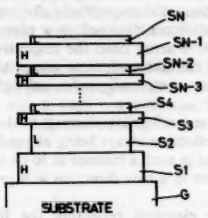
Hitoshi Kageyama, Azuchi, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Dec. 21, 1989, Ser. No. 455,969

Claims priority, application Japan, Dec. 23, 1988, 63-325426

Int. Cl.[5] G02B 5/28

U.S. Cl. 350—164 9 Claims




1. An interference filter for use in a copying machine to be positioned in an optical path of light passing through an image-forming lens for preventing transmission of light having a predetermined wavelength range about a wavelength, λo, said interference filter comprising:

a substrate for carrying a plurality, N, of layers superimposed thereon;

said layers including layers of a high-refractive index element arranged at odd-numbered places in order as counted from said substrate, layers of a low-refractive index element arranged at even-numbered places in order as counted from said substrate, and the Nth layer as counted from said substrate being of a low-refractive index element;

wherein:
the first layer as counted from said substrate has an optical layer thickness greater than λo/2,
the second layer as counted from said substrate has an optical layer thickness greater than λo/2,
the third layer as counted from said substrate has an optical layer thickness greater than λo/4,
the fourth layer as counted from said substrate has an optical layer thickness greater than λo/4,
the N−1 layer as counted from said substrate has an optical layer thickness greater than λo/2, and
the Nth layer as counted from said substrate has an optical layer thickness smaller than λo/4.

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**5,035,486**

## OPTICAL IMAGING APPARATUS

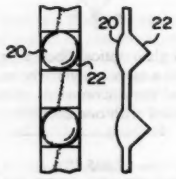
**Toshiyuki Inokuchi, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 93,282, Sep. 4, 1987, abandoned, which is a continuation of Ser. No. 235,237, Feb. 17, 1981, abandoned. This application Mar. 6, 1989, Ser. No. 319,847**

**Claims priority, application Japan, Feb. 22, 1980, 55-21386; Mar. 12, 1980, 55-31099; Apr. 4, 1980, 55-44330; Apr. 4, 1980, 55-44331; Aug. 15, 1980, 55-112491**

**Int. Cl.[5] G02B *27/00***

**U.S. Cl. 350—167** **19 Claims**




1. An optical imaging apparatus, comprising:
a flat multi-reflective array having a number of reflecting elements arranged in a row, each reflecting element having two symmetrical flat reflecting surfaces which face each other, are oriented at a predetermined angel to the row and intersect along a line perpendicular to the row;
a flat multi-refractive array having a number of image focusing refracting elements arranged in a row in front of the reflecting elements respectively for refracting a light image of an object disposed in a plane in front of the multi-refractive array onto the respective reflecting elements, each refracting element comprising a converging lens having a substantially spherical light refracting surface;
the refracting and reflecting elements of the multi-refractive and multi-reflective arrays being aligned with each other and arranged in such a manner as to be spaced from adjacent elements in a row direction at a predetermined distance;
the reflecting elements reflecting the light image back through the respective refracting elements, said predetermined angle of orientation between the two reflecting surfaces, a focal length of the converging lenses, a spacing between respective reflecting and refracting elements and a distance between the refracting elements and said plane being predetermined in such a manner that a focussed image of the object consisting of superposed light images from said individual refracting and reflecting elements is formed in said plane which is equal in size to said object, erect in a direction parallel to said rows and inverted in a direction perpendicular to said rows; and
a light intercepting plate means disposed between the multi-refractive and multi-reflective arrays, the plate means having openings aligned with the respective elements of the multi-refractive and multi-reflective arrays which are shorter in the direction of said rows and longer in a direction perpendicular thereto.

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**5,035,487**

## METHOD AND APPARATUS FOR RELEASABLY MOUNTING AN OPTICAL DEVICE

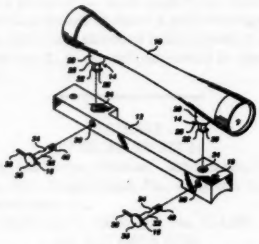
**Rudolf Herz, Baisweil, Fed. Rep. of Germany, assignor to Leupold & Stevens, Beaverton, Oreg.**

**Filed Aug. 8, 1990, Ser. No. 564,459**

**Claims priority, application Fed. Rep. of Germany, Aug. 8, 1989, 8909502**

**Int. Cl.[5] G02B *7/02***

**U.S. Cl. 350—245** **18 Claims**



1. A mounting system for releasably mounting an optical device, comprising:
a support member having at least one stud receiving bore and at least one rotating shaft receiving bore formed therein;
at least one stud having a groove formed therein operably connectable to the optical device and capable of being received within the stud receiving bore; and
at least one rotating shaft having a groove formed therein and capable of being received within said rotating shaft receiving bore, said rotating shaft engageable with the groove formed in said stud in a locked position and disengageable with the groove formed in said stud in an unlocked position.

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**5,035,488**

## METHOD OF MANUFACTURING LIQUID CRYSTAL DEVICES HAVING SEMICONDUCTOR SWITCHING ELEMENTS

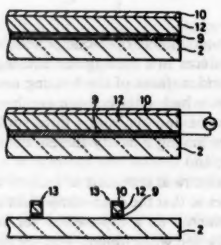
**Ippei Kobayashi, Atsugi, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan**

**Filed Jun. 10, 1988, Ser. No. 204,862**

**Claims priority, application Japan, Dec. 7, 1987, 62-146683; Dec. 7, 1987, 62-146683**

**Int. Cl.[5] G02F *1/13***

**U.S. Cl. 350—333** **6 Claims**




1. In a method of manufacturing liquid crystal devices, the steps comprising:

forming a first conductive film on a substrate;
forming a semiconductor layer with a pin junction on said first conductive film;
forming a second conductive film on said semiconductor layer;
applying a voltage across said semiconductor layer in the reverse direction through said first and second conductive films in order to repair short current paths present in said semiconductor layer;
patterning said first and second films and said semiconductor layer to produce a plurality of driving devices;
forming a first electrode arrangement associated with said driving devices; and
joining said substrate to an opposite substrate having a second arrangement with a liquid crystal layer therebetween.

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**5,035,489**

## LIQUID CRYSTAL DEVICE HAVING TWO SUPER TWISTED NEMATIC CELLS

**Chiyoaki Iijima; Yuzuru Sato; Hiroshi Wada; Osamu Okumura, and Satoshi Kamada, all of Suwa, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan**

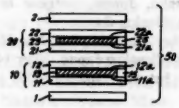
**Filed Apr. 27, 1989, Ser. No. 343,987**

**Claims priority, application Japan, May 19, 1986, 61-114299; Jul. 22, 1986, 61-172142; Jul. 22, 1986, 61-172143; Jul. 22, 1986, 61-172144; Dec. 19, 1986, 61-303168; Apr. 28, 1988, 63-106192**

**The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.**

**Int. Cl.[5] G02F *1/13***

**U.S. Cl. 350—335** **28 Claims**



1. An electro-optical device, comprising:
a first transparent twisted nematic liquid crystal cell including a pair of first spaced apart opposed substrates with transparent electrodes selectively disposed thereon, the opposed first substrates each having a liquid crystal orientation direction, and a first twisted nematic liquid crystal material disposed in the space between the first substrates and having a twist angle greater than 90°;
a second transparent twisted nematic liquid crystal cell adjacent to the first liquid crystal cell, the second cell including a pair of second spaced apart opposed substrates with transparent electrodes selectively disposed thereon, the opposed second substrates each having a liquid crystal orientation direction, and a second twisted nematic liquid crystal material disposed in the space between the second substrates, having a twist angle greater than 90° and characterized by a product of refractive index of anisotropy Δn and thickness d which varies based on ambient temperature conditions; and
a linear polarizer disposed on exterior surfaces of the first twisted nematic liquid crystal cell and the second twisted nematic liquid crystal cell;
wherein linearly polarized light entering the device through the polarizer adjacent to the first cell is emitted from the first cell as elliptically polarized light, passes through the second cell and is emitted from the second cell as substantially linearly polarized light by varying the voltage applied to the transparent electrodes of the second cell in accordance with ambient temperature conditions.

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**5,035,490**

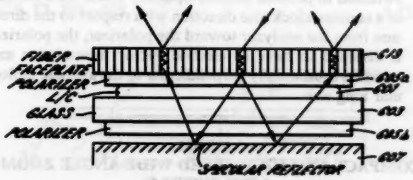
## FIBER OPTIC

**Laurence M. Hubby, Jr., Palo Alto, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Jan. 9, 1990, Ser. No. 462,679**

**Int. Cl.[5] G02F *1/133***

**U.S. Cl. 350—337** **11 Claims**




1. A visual image display apparatus comprising:
a liquid crystal layer having a front and back surface;
a front orientation layer formed adjacent to said front surface of said liquid crystal layer;
a back orientation layer formed adjacent to said back surface of said liquid crystal layer;
a front transparent electrode formed adjacent to said front orientation layer;
a rear transparent electrode formed adjacent to said rear orientation layer;
a reflector serving to reflect light received from the rear of said liquid crystal layer back through said liquid crystal layer;
an optical fiber faceplate formed in front of said front transparent electrode; and
a front polarizer formed separate from and between said front transparent electrode and said optical fiber faceplate.

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**5,035,491**

## LIQUID CRYSTAL APPARATUS

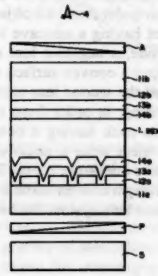
**Hideyuki Kawagishi, Fujisawa; Hirofumi Iwamoto, Hiratsuka; Akira Tsuboyama, Sagamihara, and Tadashi Mihara, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 3, 1990, Ser. No. 503,678**

**Claims priority, application Japan, Apr. 3, 1989, 1-81547; Apr. 3, 1989, 1-81548; Apr. 3, 1989, 1-81549; Apr. 3, 1989, 1-81550**

**Int. Cl.[5] G02F *1/13***

**U.S. Cl. 350—350 S** **32 Claims**



1. A liquid crystal apparatus, comprising:

a liquid crystal cell comprising a pair of substrates, and a chiral smectic liquid crystal showing at least two different optically stable states formed by cooling from a uniaxial alignment phase and disposed between the substrates; and

a polarizer and an analyzer disposed to sandwiched the liquid crystal cell;

wherein the chiral smectic liquid crystal, polarizer and analyzer are disposed to satisfy a set of conditions that the long axes of the chiral smectic liquid crystal molecules are aligned with a twist in a clockwise direction along the direction from the polarizer toward the analyzer to form an average molecular axis providing one optically stable state, and when the average molecular long axis is switched to provide another optically stable state latched in a counter-clockwise direction with respect to the direction from the analyzer toward the polarizer, the polarizer is disposed to have an electric vector transmission axis which is substantially perpendicular to the average molecular long axis.

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**5,035,492**

## COMPACT AND HIGH-SPEED WIDE-ANGLE ZOOM LENS SYSTEM

**Takayuki Ito, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

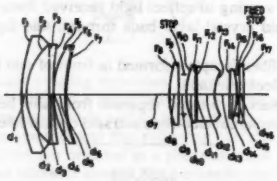
**Continuation of Ser. No. 160,045, Feb. 24, 1988, Pat. No. 4,844,599. This application Apr. 28, 1989, Ser. No. 345,371**

**Claims priority, application Japan, Feb. 27, 1987, 62-44895**

**The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.**

**Int. Cl.[5] G02B *15/177, 13/18***

**U.S. Cl. 350—423** **14 Claims**



1. A compact and high-speed wide-angle zoom lens system having a sub-system responsible for zooming, said sub-system comprising, in order from the object side: a first lens unit having a negative focal length, a second lens unit having a positive focal length and a fixed third lens unit forming a relay lens sub-system that is subsequent to the zooming sub-system and which extends the focal length thereof, said lens system being capable of changing its focal length while maintaining a constant focal position by mechanically moving the first and second lens units, the improvement wherein the first lens unit has at least one aspherical surface and is of a three-element composition comprising, in order from the object side, a negative meniscus lens element having a concave surface of large curvature on the image side, a negative lens element, and a positive lens element having a convex surface of large curvature on the object side, and the second lens unit has a four-element composition comprising, in order from the object side, two positive lens elements each having a convex surface of large curvature on the object side, a negative lens element having a surface of concave curvature on the image side, and a positive lens element having a convex surface of large curvature on the image side, said lens system further satisfying the following conditions:

$$0.5 < \frac{f_2}{|f_1|} < 0.63 \quad (1)$$

-continued

$$0.9 < \frac{|f_1|}{f_L} < 1.2 \quad (2)$$

$$1.0 < m_3 < 1.2 \quad (3)$$

$$1.7 < N_{1n} \quad (4)$$

$$1.7 < N_{2p} \quad (5)$$

where,

$f_1$ is the focal length of the first lens unit;

$f_2$ is the focal length of the second lens unit;

$f_L$ is the focal length of the overall system at the narrow-angle end;

$m_3$ is magnification by the third lens unit;

$N_{1n}$ is the average of the refractive indices at the d-line of the two negative lens elements in the first lens unit; and

$N_{2p}$ is the average of the refractive indices at the d-line of the two positive lens elements in the second lens unit on its object side.

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**5,035,493**

## ZOOMING OPERATION APPARATUS OF ZOOM LENS

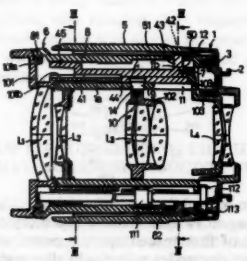
**Osamu Tanaka, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed May 12, 1989, Ser. No. 351,053**

**Claims priority, application Japan, May 14, 1988, 63-117959**

**Int. Cl.[5] G02B *15/00***

**U.S. Cl. 350—429** **18 Claims**



1. A zooming operation apparatus of a zoom lens provided with at least a first and a second lens unit movable in the direction of an optical axis, comprising:

a stationary barrel secured to a camera body;

a zooming operation ring only rotatably held by the stationary barrel;

a zoom cam ring, positioned inside the zooming operation ring and held by the stationary barrel, being movable only rectilinearly in the direction of the optical axis, and moving therewith the first lens unit rectilinearly;

a first zoom driving mechanism formed at an engaging section where the zooming operation ring is engaged with the zoom cam ring and at a position between the zoom cam ring and the stationary barrel so as to change a rotation of the zooming operation ring to a rectilinear movement of the zoom cam ring; and

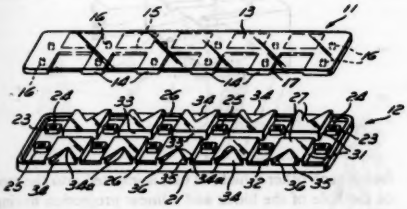
a second zoom driving mechanism formed at a position between the zoom cam ring and the stationary barrel so as to change the rectilinear movement of the zoom cam ring to another rectilinear movement of the second lens unit.

5,035,494

## MOLDED PLASTIC ARTICLE ASSEMBLY MEANS

Kenneth J. Foldenauer, Anaheim, Calif., assignor to V-Tech, Inc., Pomona, Calif.

Filed Mar. 1, 1990, Ser. No. 487,408
Int. Cl.[5] G02B 21/34; G01N 21/01
U.S. Cl. 350—536 20 Claims



1. An interference fit joint for molded plastic pieces having a plurality of interlocking joints comprising:
a plurality of pegs having a circular cross section having a diameter extending outwardly from a first piece; and
a plurality of peg receivers on a second piece, each having an elongate receiving hollow having a first dimension 1.0 times the diameter of said pegs to achieve an interference fit and a second dimension of at least 1.25 the diameter of said pegs, whereby each peg is received by a peg receiver and the first piece is joined to the second piece.

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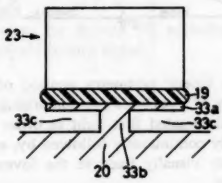
5,035,495

## OPTICAL UNIT INCLUDING A SUBSTRATE AND OPTICAL ELEMENT SUPPORTED ON THE SUBSTRATE SUCH THAT THERMAL STRESSES ARE PREVENTED FROM BEING EXERTED ON THE OPTICAL ELEMENT

Shuhei Toyoda, Nagoya; Syunzo Mase, Tobishima; Masami Matsuura, Aichi, and Shogo Kawaguchi, Nagoya, all of Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan

Continuation of Ser. No. 159,735, Feb. 24, 1988, abandoned.
This application Mar. 15, 1990, Ser. No. 494,817
Claims priority, application Japan, Feb. 27, 1987, 62-46369; Feb. 27, 1987, 62-46370
Int. Cl.[5] G02F 1/03, 1/09; G02B 7/192
U.S. Cl. 350—588 10 Claims



1. An optical unit, comprising:
a substrate;
at least one optical element; and
a constricted portion consisting of a single protrusion interposed between said substrate and each said optical element, said constricted portion fixedly supporting each said optical element to said substrate during use of said optical element, for protecting each said optical element from thermal stresses exerted thereto due to a difference in thermal expansion coefficient between said substrate and each said optical element, to thereby prevent a variation in optical properties of each said optical element due to said thermal stresses;
wherein said protrusion has a bonding surface which is parallel to a plane of said substrate at which said substrate is bonded to a bonding surface of each said optical element.

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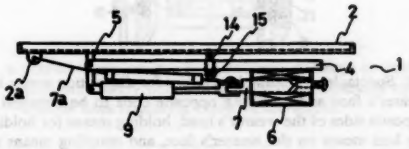
5,035,496

## OUTSIDE BACK MIRROR DEVICE FOR USE IN AN AUTOMOBILE

Moon Houy An, Seoul, Rep. of Korea, assignor to Duk Yu Industrial Co., Ltd., Seoul, Rep. of Korea

Filed Apr. 6, 1990, Ser. No. 505,506
Claims priority, application Rep. of Korea, Apr. 27, 1989, 1989-5290
Int. Cl.[5] G02B 7/18
U.S. Cl. 350—605 6 Claims



1. An outside back mirror device having a mirror for use in an automobile, which comprises:
an outside back mirror casing,
a solenoid actuated by a drive circuit for turning on and off the power for a certain time period,
a hydraulic member for receiving the force applied by said solenoid so as to make said mirror move,
a shock absorber for delaying the return of said mirror to its original position, and
an elastic member including a fixing bolt and a spring for causing said mirror to return to its original position.

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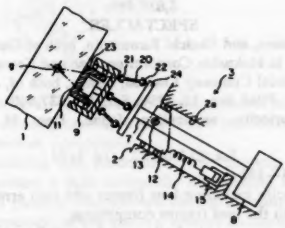
5,035,497

## MIRROR SUPPORTING DEVICE

Noboru Itoh, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 20, 1990, Ser. No. 540,724
Claims priority, application Japan, Jun. 26, 1989, 1-163464
Int. Cl.[5] G02B 7/18
U.S. Cl. 350—611 8 Claims



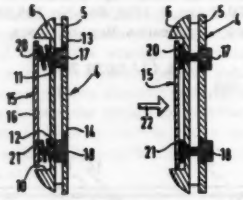
1. A mirror supporting apparatus, comprising:
a support member provided on the back surface of a mirror outside the entire thickness thereof;
a mirror cell arranged opposite said support member;
a lever provided on said mirror cell and extended toward a center of gravity of said mirror; and
connection means for connecting said lever with said support member so as to enable said lever to pivot about said center of gravity of the mirror.

5,035,498

## SPECTACLES WITH REMOVABLE SIDE-PIECES OR BAND

Bollé Robert, Oyonnax, France, assignor to Etablissements Bolle Georges, Robert et Maurice, Oyonnax, France

Filed Jan. 9, 1990, Ser. No. 462,474
Claims priority, application France, Nov. 21, 1989, 89 15235
Int. Cl.[5] G02C 5/14
U.S. Cl. 351—116 7 Claims



1. Spectacles including lens means for disposition across the wearer's face and including opposite ends to be disposed at opposite sides of the wearer's head, holding means for holding the lens means on the wearer's face, and coupling means removably coupling said holding means to said opposite ends, said coupling means including:

a clip integral with said holding means and comprising two wings arranged opposite each other and between which extends one end of said lens means, a first wing having a first hole therethrough of a predetermined dimension and a second wing having a second hole therethrough of a dimension greater than said first hole;

an elongated shank having at one end a push-button and at a second end an enlarged pin, said pin being received through said second hole, said shank, between said push-button and pin, being received through said first hole, said push-button being of a size too great to pass through said first hole so that said push-button may be moved between a first position in which said pin extends between said wings and a second position in which said shank, between said push-button and pin, extends between said wings;

a mortise provided in said end of said lens means, said mortise having a dimension adapted to receive said pin and emerging at said one end of said shield lens means by an opening having a dimension adapted to receive said shank therethrough and preventing passage of said pin therethrough.

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5,035,499

## SPECTACLES

Kanji Kitamura, and Shuichi Kawamoto, both of Osaka, Japan, assignors to Hokushin Corporation, Yao and Kawamoto Optical Industrial Company Limited, Osaka, both of, Japan

Filed Jun. 13, 1990, Ser. No. 537,440
Claims priority, application Japan, Dec. 15, 1989, 1-145190[U]
Int. Cl.[5] G02C 5/14, 5/22
U.S. Cl. 351—153 3 Claims

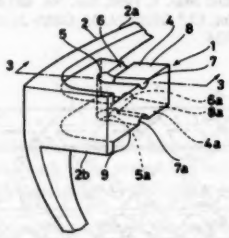
1. Spectacles including lens frames and two arms pivotally connected to the lens frames comprising:

a lens frame corner including a substantially parallelepiped block extending from the lens frame and having a top and a bottom surfaces,

each of the top and bottom surfaces of said block having a recess or a hole, a first groove having a substantially semicircular section, and a second groove having a substantially semicircular section at right angle with the first grooves, and,

an arm end including a pair of parallel planar strips, the distance between the upper strip and the lower strip being such that it allows insertion of the block of the frame corner,

each of the strip having a substantially cylindrical projection



facing each other which, in use, is inserted into the recess or the hole of the block and a linear projection having a substantially semicircular section, which, in use, is inserted into one of the grooves of the block.

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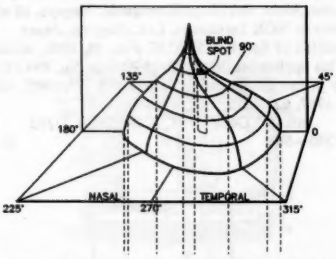
5,035,500

## AUTOMATED OCULAR PERIMETRY, PARTICULARLY KINETIC PERIMETRY

Dale A. Rorabaugh, P.O. Box 1864, Rancho Santa Fe, Calif. 92067; Neil Davis, 3092 Hendricks Hill Dr., Eugene, Oreg. 97403; George A. Mansfield, Jr., 5543 Barkla, San Diego, Calif. 92122, and Vince Brancaccio, 3092 Hendricks Hill Dr., Eugene, Oreg. 97403

Continuation of Ser. No. 231,764, Aug. 12, 1988, abandoned.
This application Mar. 26, 1990, Ser. No. 503,116
Int. Cl.[5] A61B 3/02
U.S. Cl. 351—226 61 Claims




1. A reverse kinetic perimetry method of examining the visual sensitivity of a patient's eye comprising:

moving an illuminated first light in order that it may be substantially continuously followed by, and substantially continuously visually fixed to the fovea of, a patient's moving eye;

illuminating at least one second light while it assumes various distances of separation from, and angles relative to, the moving first light;

querying the patient to indicate periods that he/she does and does not visually detect the at least one second light while fixedly visually following the first light, each change in either sense between periods of detection and periods of non-detection constituting a temporal juncture;

computing relative positions, in both distances of separation and relative angles, of the first and of the at least one second lights upon at least some of the temporal junctures; and

recording the computed relative positions;

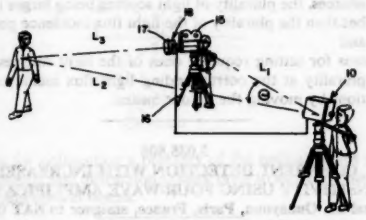
wherein the aggregate recorded relative positions indicate the visual sensitivity of the patient's eye.

**5,035,501**

## AUTOMATIC FOCUSING SYSTEM FOR USE WITH A MOTION PICTURE CAMERA

**Howard J. Preston, 920 Centinela Ave., Santa Monica, Calif. 90403**

**Filed Jan. 17, 1990, Ser. No. 466,223**
**Int. Cl.[5] G03B *13/36***
**U.S. Cl. 352—140** **2 Claims**




1. An automatic focusing system for use with a motion picture camera which is mounted on a first tripod and which includes a variable focus lens and an adjusting mechanism for adjusting the variable focus lens so that an image of a photographic subject is in focus on a focal plane, said automatic focusing system comprising:

a. a housing which is mounted on a second tripod which is disposed apart from the motion picture camera a first distance and from the photographic subject a second distance;

b. range-finding means for determining said first distance along a first line and said second distance along a second line and for providing a first signal and a second signal which are proportional to said first and second distances, respectively, said range-finding means being mechanically coupled to said housing;

c. angle-measuring means for measuring said angle by which said first and second lines diverge from each other and for providing a third signal which is proportional to said angle, said angle-measuring means being mechanically coupled to said housing;

d. processing means for processing said first, second and third signals to determine a third distance between the motion picture camera and the photographic subject and generating an output signal which correlates to said third distance; and

e. driving means for driving the adjusting mechanism in response to said output signal.

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**5,035,502**

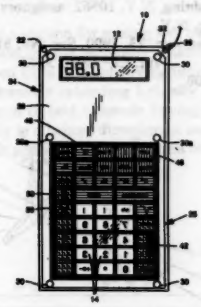
## TRANSPARENT CALCULATOR FOR OVERHEAD PROJECTION

**William T. Stokes, 1125 Robin Way, Sunnyvale, Calif. 94087**

**Filed Aug. 28, 1989, Ser. No. 400,158**
**Int. Cl.[5] G09B *19/00***
**U.S. Cl. 353—122** **16 Claims**

1. A hand held calculator of the type having a transparent window with a liquid crystal numerical display and having transparent number keys and function keys such that operations performed on the calculator and results obtained thereby can be projected onto a screen when the calculator is laid on the light platform of an overhead projector, comprising,

a plurality of colors in transparent backgrounds of the function keys, with the function keys grouped into different colors so that each function key can be identified with a color on an overhead projector screen, and




a grid of heavy opaque lines outlining the keys so that the keys are clearly defined on the screen, separated by the opaque lines appearing black on the screen.

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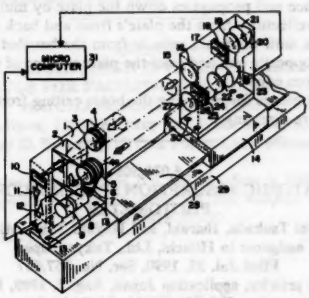
**5,035,503**

## ELECTRO OPTICALLY CORRECTED COORDINATE MEASURING MACHINE

**Yaacov Sadeh, 11/6 Bialik, Nes Ziona, and Yaacov Makover, 87 Moshav Bet Alazari, Rechovot, both of Israel**

**Continuation of Ser. No. 401,039, Aug. 31, 1989, which is a continuation of Ser. No. 147,134, Jan. 22, 1988. This application Dec. 10, 1990, Ser. No. 625,020**
**Claims priority, application Israel, Jan. 23, 1987, 81364**
**Int. Cl.[5] G01B *11/26;* G01C *1/00***
**U.S. Cl. 356—152** **22 Claims**




1. A device for electro-optical monitoring of angular deflections of a moving carriage relative to a stationary track along which it moves, comprising:

a transmitting unit mounted on the moving carriage and comprising a light source for illuminating a two-dimensional pattern, said pattern having a configuration such that rotation of the pattern around its center can be detected;

a receiving unit mounted on the track in light receiving relationship with the transmitting unit and comprising an optical sensor means for sensing the shift and roll of the illuminated pattern transmitted from said transmitting unit and providing an output signal corresponding thereto; and

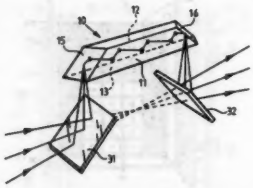
micro computer means arranged to receive the output signal from said receiving unit and utilize the information derived from said signal to determine the angular deflection of said carriage.

5,035,504

## LIQUID ANALYSIS WITH INTERNAL REFLECTION SPECTROSCOPY

Milan Milosevic, Fishkill, N.Y., and Nicolas J. Harrick, Croton Dam Rd., Ossining, N.Y. 10562, assignors to Nicolas J. Harrick, Ossining, N.Y.

Filed Apr. 23, 1990, Ser. No. 512,451
Int. Cl.[5] G01J 3/42
U.S. Cl. 356—300 20 Claims



1. An internal reflection spectroscopy system comprising:
an internal reflection plate generally of the trapezoidal type having a length dimension, a height dimension, and a thickness dimension and having substantially parallel, major front and back surfaces generally defined by the plate's length and height dimensions, substantially parallel, bottom and top edge surfaces generally defined by the plate's length and thickness dimensions, and left and right side edge surfaces generally defined by the plate's height and thickness dimensions, said side edge surfaces being compound beveled and each forming with the front surface an angle in the range of about 20°–70°,
means for supporting the internal reflection plate in such manner that at least one major surface is substantially exposed to receive a sample to be analyzed,
first means for directing an incident radiation beam to one of the top and bottom edge surfaces such that the beam enters the plate and directly impinges on one of the beveled surfaces at one end and is reflected from that beveled surface and propagates down the plate by multiple internal reflections from the plate's front and back major surfaces until the beam reflects from the beveled surface at the opposite end and exits the plate via one of its top and bottom edges,
second means for receiving the beam exiting from the plate and re-directing it.

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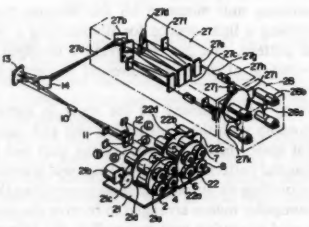
5,035,505

## ATOMIC ABSORPTION SPECTROSCOPY PHOTOMETER

Masamichi Tsukada, Ibaraki, and Hayato Tobe, Mito, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 25, 1990, Ser. No. 557,647
Claims priority, application Japan, Aug. 2, 1989, 1-199408
Int. Cl.[5] G01J 3/10; G01N 21/74
U.S. Cl. 356—319 16 Claims



1. An atomic absorption spectroscopy photometer comprising:
sample atomizing means for heating to atomize a sample;
a plurality of light sources disposed at a like number of light flux incidence positions for causing light having required wavelengths to enter the atomized sample;
means for measuring the degrees of light absorption of a plurality of elements contained in the sample by detecting the fluxes of light which has passed through the atomized sample;
a plurality of holder means for holding the plurality of light sources, the plurality of light sources being larger in number than the plurality of the light flux incidence positions; and
means for setting required ones of the light sources of the plurality at the corresponding light flux incidence positions by moving the holder means.

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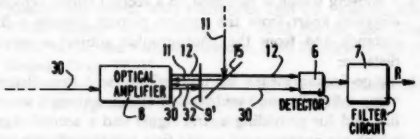
5,035,506

## COHERENT DETECTION WITH INCREASED SENSITIVITY USING FOUR-WAVE AMPLIFICATION

Michel M. Ouhayoun, Paris, France, assignor to SAT (Societe Anonyme de Telecommunications), France

Filed Nov. 9, 1989, Ser. No. 434,910
Claims priority, application France, Nov. 9, 1988, 88 14611
Int. Cl.[5] G01B 9/02
U.S. Cl. 356—349 11 Claims




1. A coherent optical detection arrangement for detecting a coherent optical target signal with increased sensitivity, comprising:
(a) means for generating a coherent optical auxiliary signal;
(b) a non-linear, solid medium, optical amplifier for amplifying the target signal to generate a coherent optical amplified signal;
(c) pump means for generating a first coherent optical pumping signal and a second coherent optical pumping signal from the auxiliary signal, and for conducting the first pumping signal in a first direction to the amplifier, and for conducting the second pumping signal to the amplifier in a second direction opposite to the first direction;
(d) beat means for beating the auxiliary signal and the amplified signal together to generate a beat signal indicative of the target signal; and
(e) means for detecting the beat signal and, in turn, the target signal.

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5,035,507

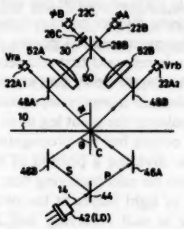
## GRATING-INTERFERENCE TYPE DISPLACEMENT METER APPARATUS

Nobuhisa Nishioki, and Tatsuo Itabashi, both of Kawasaki, Japan, assignors to Mitutoyo Corporation, Japan

Filed Dec. 12, 1989, Ser. No. 448,954
Claims priority, application Japan, Dec. 21, 1988, 63-322587; Dec. 21, 1988, 63-322588
Int. Cl.[5] G01B 9/02
U.S. Cl. 356—356 10 Claims

1. A grating-interference type displacement meter apparatus, comprising:
a scale including a diffraction grating formed thereon;
a detector composed of a light source for irradiating said diffraction grating with an optical beam emitted therefrom and of an optical detector element for photoelectrically converting a combined beam of a plurality of optical beams produced by said diffraction grating, said detector

generating a periodically-changing detection signal responsibly to a relative displacement thereof with respect to said scale; and



means for collimating a plurality of the optical beams produced by said diffraction grating prior to said combination of said optical beams.

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**5,035,508**

## LIGHT ABSORPTION ANALYSER

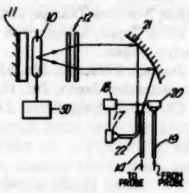
**Timothy J. N. Carter, Sheppey, and Roger A. Bunce, Bournville, both of England, assignors to National Research Development Corporation, London, England**

**Filed Dec. 29, 1987, Ser. No. 139,181**

**Claims priority, application United Kingdom, Jan. 5, 1987, 8700061**

**Int. Cl.[5] G01J *3/51***

**U.S. Cl. 356—416** **10 Claims**



1. A light absorption analyser comprising:
a body
a probe head
a flash tube in said body and actuatable to emit output pulses of light
spectrophotometric means in said body for receiving light from said flash tube,
said spectrophotometric means including
a) an interference filter for passing only light of a predetermined frequency in a given direction and
b) a doubly concave parabolic mirror for receiving said light in said given direction and focusing said light to a point in said body, and
collector means at said point, said collector means including at least one fibre-optic output light conductor,
said light conductor being for conducting said collected light to said probe head from said body.

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**5,035,509**

## MULTI-CHANNEL EXTRUSION SCREW WITH A ZIG-ZAG UNDERCUT BARRIER

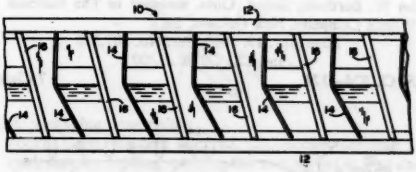
**George A. Kruder, Mount Gilead, Ohio, assignor to HPM Corporation, Mount Gilead, Ohio**

**Filed Aug. 13, 1990, Ser. No. 566,483**

**Int. Cl.[5] B29B *7/42***

**U.S. Cl. 366—89** **16 Claims**

1. A plasticating apparatus comprising:
a barrel having an inlet and an outlet; and
a rotatable screw disposed within and cooperating with an inner wall of said barrel, said screw adapted for plasticating resinous material fed into said barrel through said inlet;
said screw having a helical passage formed by a conveying flight to transport resinous material from said inlet toward said outlet;
said screw having a section for mixing and melting the resinous material, said section including a helical, zig-zag barrier flight spaced from said conveying flight to divide said passage into channels extending helically adjacent along said section, each of said channels having a depth which varies cyclically in a helical direction of such channel, the minimum depth portions of the channels on opposite sides



of said barrier flight defining wave crests which are displaced helically from each other, said barrier flight having a first segment converging toward one side of said conveying flight, and a second segment diverging away from said one side of said conveying flight, there being a plurality of said converging first and diverging second segments repeating throughout said mixing section, the width of each of said channels, which is defined by said barrier flight and said conveying flight, decreasing from each of said wave crests to its adjacent downstream valley and said width increasing from each of said valleys to its adjacent downstream wave crest.

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**5,035,510**

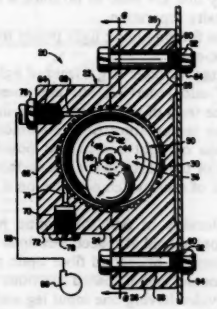
## LIGHT WEIGHT, HIGH EFFICIENCY VIBRATOR APPARATUS FOR FACILITATING BULK MATERIAL HANDLING AND TRANSPORT

**John H. Fallows, 12025 Fairway Dr., Little Rock, Ak. 72212, and Kenny D. Breeding, 15 Oak Forest Loop, Maumelle, Ak. 72118**

**Continuation-in-part of Ser. No. 402,464, Sep. 1, 1989. This application Jan. 16, 1990, Ser. No. 465,923**

**Int. Cl.[5] B01F *11/00***

**U.S. Cl. 366—126** **11 Claims**



1. A rotary ball type industrial vibrator comprising:
a housing securable to an object to be vibrated, said housing

having a chamber therein with a generally circular cross-section and an annular side portion;

a force-imparting ball member captively retained in said chamber and being rotationally retained in said chamber and being rotationally drivable around said side portion to impart vibrational forces to said housing and an object to which it is secured; and

means for utilizing pressurized fluid from a source thereof to simultaneously create a circumferentially spaced plurality of pressurized fluid streams which generally tangentially enter said chamber through said annular side portion thereof and alternately strike said force-imparting ball member and rotationally propel it around said annular side portion of said chamber.

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**5,035,511**

## DISTRIBUTED FIBER OPTIC TEMPERATURE SENSOR BASED ON TIME DOMAIN TRANSMISSION

**John W. Berthold, Salem, Ohio, assignor to The Babcock & Wilcox Company, New Orleans, La.**

**Filed Apr. 10, 1990, Ser. No. 507,325**
**Int. Cl.[5] G01K *11/00***
**U.S. Cl. 374—124** **7 Claims**

1. An apparatus for sensing temperature, comprising:

at least one fiber optic time domain intensity transmission network having an output bus with a plurality of first fiber optic power dividers spaced therealong, each first fiber optic power divider having one input leg and two output legs, said network including a fiber optic delay line between each first fiber optic power divider for delaying the light signal from one first power divider to the next along said output bus, said network further including a receiving bus with a plurality of second fiber optic power dividers spaced therealong, each second power divider comprising two input legs and one output leg, a plurality of fiber optic bridges each connected between one output leg of a first power divider in said output bus and one input leg of a second power divider in said receiving bus, the input leg of the initial first power divider in said output bus comprising an input for said output bus and the output leg of the final second power divider in said receiving bus comprising the output of said receiving bus, each of said first and second power dividers being adapted to be in thermal contact with a surface whose temperature is to be sensed, wherein said first and second power dividers and said fiber optic delay line are used to produce a time to space domain intensity separation;

a light source for supplying light pulses to the input of said output bus; and

a light detector for receiving a train of light pulses from the output of said receiving bus and measuring intensities thereof, the train of light pulses being modified as a function of the temperature of the surface which modifies transmission of light across said power dividers as an indication of temperature for the surface.

7. A method of sensing temperature on a surface, comprising:

placing a plurality of first fiber optic power dividers in thermal contact and at spaced locations along the surface;

placing a plurality of second fiber optic power dividers in thermal contact and at spaced locations along the surface;

each first divider having one input leg and two output legs, each second power divider having two input legs and one output leg;

a fiber optic bridge connecting one output leg of each first power divider with one input leg of a respective second power divider;

connecting one output leg of each first power divider by a fiber optic delay line to the input leg of a subsequent first power divider to form an output bus and the one output of each second power divider being connected to one of the inputs of a subsequent second power divider to form a receiving bus, wherein said first and second power dividers and said fiber optic delay line are used to produce a time to space domain intensity separation;

applying a light pulse to the input leg of an initial first power divider in said output bus for propagation along said output bus and for dividing a portion of the signal to each bridge for return on said receiving bus; and

detecting a train of light pulses at the output leg of a final second divider in said receiving bus, the train of light pulses being modified as a function of the temperature of the surface which modifies transmission of light across said power dividers as an indication of temperature for the surface.

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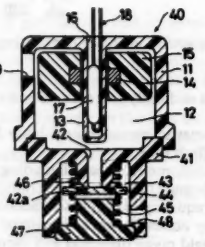
**5,035,512**

## OIL-LEVEL SENSING APPARATUS HAVING A TIME DELAY FUNCTION

**Yosuke Tateishi, Anjo; Norihisa Takano, and Kenji Hashimoto, both of Toyota, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan**

**Filed Jun. 12, 1990, Ser. No. 536,803**
**Claims priority, application Japan, Jul. 18, 1989, 1-84153**
**Int. Cl.[5] G01K *5/62*; G05D *23/08***
**U.S. Cl. 374—142** **7 Claims**




1. An oil level sensing apparatus comprising:

means for defining an oil reservoir whose oil level is to be sensed;

body means for defining a volume in said oil reservoir, said body means having an open bottom;

oil level sensing means in said volume for sensing an oil level in said volume and outputting an oil level signal;

temperature sensitive closure means positioned to sense the temperature of the oil in the oil reservoir and being provided for resiliently moving to selectively form and close an opening in said open bottom to permit oil in said volume to drain therefrom at elevated oil temperatures; and

resilient means for opposing the movement of said closure to selectively form said opening, whereby said opening defines a restriction and the draining of oil from said volume is delayed.

5,035,513

## FLUORESCENT MATERIAL TEMPERATURE SENSOR

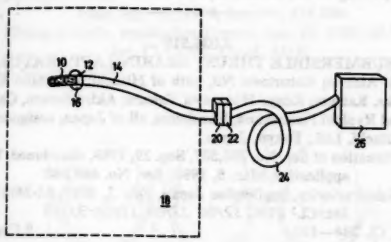
Gustav W. Fehrenbach, Hanau, and Doris Peukert, Hofheim, both of Fed. Rep. of Germany, assignors to Degussa AG, Frankfurt am Main, Fed. Rep. of Germany

Filed Jan. 11, 1990, Ser. No. 463,377

Claims priority, application United Kingdom, Jan. 24, 1989, 3902001

Int. Cl.[5] G01J 5/02; G01K 11/20

U.S. Cl. 374—161 2 Claims




1. Use of a fluorescent material, whose decay time is temperature-dependent, for determining the temperature in a room or body, said fluorescent material being optically connected, through a light wave guide, to a device disposed to generate exciting radiation and to detect and evaluate received radiation, wherein said fluorescent material is filled in a capsule connected to said light wave guide and said fluorescent material consists of homogeneously pulverized inhomogeneous single crystals and said fluorescent material has a grain size below 40 μm.

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5,035,514

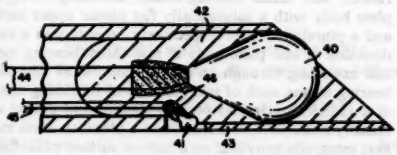
## THERMAL PROBE FOR MEASURING THERMAL PROPERTIES OF A FLOWING MEDIUM

William H. Newman, Jamaica Plain, Mass., assignor to Thermal Technologies, Inc., Cambridge, Mass.

Filed May 7, 1990, Ser. No. 520,100

Int. Cl.[5] G01F 1/68; G01K 13/02

U.S. Cl. 374—164 9 Claims




1. A probe device for heating a medium with which said device is in thermal contact for use in determining the thermal conductivity and diffusivity of said medium when no fluid is flowing therein and for determining the flow properties of said medium, including the effective thermal conductivity, the effective thermal diffusivity, or perfusion thereof when a fluid is flowing therein, said device comprising

a heater near or on said probe device for supplying heat to said medium at an interface of said device with said medium;

a temperature sensor associated with said interface for sensing the temperature at said interface;

control means connected to said probe device for maintaining the temperature at said interface substantially at a selected level with said probe device with respect to a reference temperature independently of the thermal characteristics of said medium.

5,035,515

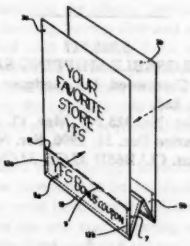
## PACKAGING HAVING DETACHABLE COUPON COMPARTMENT

Stephen A. Crossman, 16594 Terrasse Richelieu, Apt. 10, Ste-Geneviève, Canada H9H 3P4, and John R. Lloyd, 1294 Belair Drive, Dorval, Canada H9S 1H7

Filed Feb. 15, 1990, Ser. No. 480,297

Int. Cl.[5] B65D 30/22

U.S. Cl. 383—38 14 Claims




1. A packaging comprising:

a pocket made of sheet material, said pocket defining an enclosure for holding merchandise and having at least one sealed edge;

at least one detachable compartment having at least one enclosed sheet of said material, the compartment being formed by extensions of said sheet material beyond said at least one sealed edge, said extensions being folded back towards said at least one sealed edge to form said at least one enclosed sheet of said material;

a seal along at least one edge of said extensions to close said compartment;

a promotional message printed on said extensions of said detachable compartment; and

a perforation line extending parallel to said at least one sealed edge of said pocket on a compartment said thereof to make said compartment detachable from said pocket by a consumer, said pocket remaining functional when said compartment is detached.

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5,035,516

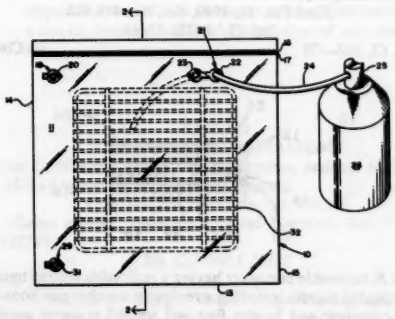
## BARBECUE GRILL CLEANER BAG

LeRoy R. Pacheco, 5230 South 935 East, Salt Lake City, Utah 84117

Filed Jun. 13, 1988, Ser. No. 205,739

Int. Cl.[5] B65D 33/01

U.S. Cl. 383—41 12 Claims



1. A disposable container for cleaning outdoor barbecue grills comprising a flexible, generally rectangular, reclosable plastic bag having opposing front and rear wall panels joined

together at the bottom and opposing side edges in a fluid tight relationship to form an article receiving compartment which is reclosable at the top edges of the wall panels by fluid tight sealing means, said bag containing closable vent means extending through a wall panel in the upper portion thereof below said sealing means so that said vent means communicates with said compartment, said bag also containing entry means extending through a wall panel in the upper portion thereof below said sealing means, said entry means communicating with said compartment and being spaced apart from said vent means.

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**5,035,517**

**RECLOSABLE SHIPPING SACK**

**Paul F. Edelman, Greenwood, Ind., assignor to KCL Corporation, Shelbyville, Ind.**

**Continuation of Ser. No. 325,247, Mar. 17, 1989, abandoned. This application Dec. 31, 1990, Ser. No. 635,404**

**Int. Cl.[5] B65D *33/26, 33/24***

**U.S. Cl. 383—61** **6 Claims**

1. A reclosable sack having a mouth through which the contents of the sack may be removed, comprising:

primary non-reclosable closure means across the mouth of the sack for closing the mouth, including a stitched separable fastener adapted for manual removal to open said primary closure means; and

secondary reclosable closure means secured to the sack across the mouth of the sack outboard of said primary closure means, for closing the mouth after opening of said primary closure means, including oppositely disposed first and second cooperating profile elements selectively interlockable when pressed together and releasable when separated.

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**5,035,518**

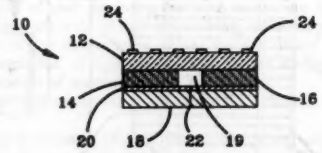
**HINGE PRESSURE SENSITIVE ADHESIVE TAB CLOSURE FOR PACKAGE**

**Jack M. McClintock, Pittsburgh, Pa., assignor to Morgan Adhesives Company, Ohio**

**Filed Feb. 16, 1990, Ser. No. 481,492**

**Int. Cl.[5] B65D *33/16***

**U.S. Cl. 383—70** **19 Claims**




1. A reclosable container having a reclosable system to close an opening therein including a reclosing member positioned on the container and having first and second pressure sensitive adhesive surfaces on one side of said member;

at least a portion of said first surface comprising an active first pressure sensitive adhesive layer bonding to said container with a permanent pressure sensitive adhesive strength;

said second surface comprising an active second pressure sensitive adhesive layer bonding to said container with a removable pressure sensitive adhesive strength;

wherein a non-adhesive area is positioned between the first and second active pressure sensitive adhesive layers whereby when member is pulled so that the second layer is peeled from a position of adherence to the container towards a position of non-adherence, it snaps across the non-adhesive area to serve as an indicator of sufficient peeling of the second layer from the container.

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**5,035,519**

**SUBMERSIBLE THRUST BEARING APPARATUS**

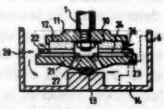
**Kooji Aizawa; Katsutoshi Nii, both of Hitachi; Kazuhiko Kawaike, Katsuta; Kengo Hasegawa, Sakura; Akira Saruta, Chiba, and Ryoichi Nakashima, Funabashi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

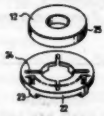
**Continuation of Ser. No. 250,507, Sep. 29, 1988, abandoned. This application Mar. 5, 1990, Ser. No. 488,948**

**Claims priority, application Japan, Feb. 2, 1987, 62-249148**

**Int. Cl.[5] F16C *32/06, 27/08, 17/04, 33/10***

**U.S. Cl. 384—121** **8 Claims**





1. A submersible thrust bearing apparatus comprising:

a rotative shaft; a shaft collar fixed to said rotative shaft;

a thrust runner mounted on said shaft collar, said thrust runner having a ring-like plate body with a substantially flat planar upper surface and a substantially flat planar bottom surface;

a thrust bearing means for slidably supporting said thrust runner, said thrust bearing means including a ring-like plate body with a substantially flat planar upper surface and a plurality of slits respectively extending in a radial direction of said plate body of said thrust bearing means and extending through an entire thickness of said thrust bearing means, each of said plurality of slits being opened at a radially inner end portion thereof and closed at a radially outer portion thereof, and a plurality of rib members integrally provided on a bottom surface of said plate body of said thrust bearing means;

a bearing frame means separate from and mounted on said thrust bearing means;

said plurality of rib members causing a difference in an amount of load deformation in a circumferential direction in accordance with a thrust load and generating a wedge-shaped clearance between a sliding face of said thrust bearing means formed at the upper surface thereof and a sliding face of said thrust runner formed at the bottom surface thereof, each of said plurality of rib members has the same width and thickness in the radial direction of said thrust bearing means and extends throughout substantially linearly from an inner end portion of said thrust bearing means to an outer end portion thereof, each of said plurality of rib members is positioned substantially at a middle area between two adjacent slits and is arranged to face an upper surface of said bearing frame means; and

wherein said plurality of rib members generates said wedge-

shaped clearance between an outlet portion of each of said plurality of slits and an inlet portion of an adjacent rib member, and the amount of load deformation in the plate body is maintained substantially the same as a value of the amount of load deformation in the radial direction of said plate body of said thrust bearing means.

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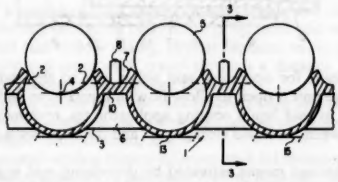
**5,035,520**

## DEFORMABLE SELF-ADJUSTING BALL BEARING CAGE

**Michel Valette, Seynod, France, assignor to S.N.R. Roulements, Annecy, France**

**Filed Apr. 10, 1990, Ser. No. 515,846**
**Claims priority, application France, Apr. 18, 1989, 89 05097**
**Int. Cl.[5] F16C *33/38, 33/41***
**U.S. Cl. 384—526** **3 Claims**



1. A self-adjusting ball bearing cage, comprising:
a ring having two axial faces;
a plurality of spherical bearing housings circumferentially distributed on one of said axial faces, said ring extending axially beyond the other of said faces at bottoms of said housings to form a plurality of projecting pads defining discontinuities in said other face;
cavities extending into said ring from said other face and between said discontinuities, whereby walls of said housings are formed in part by said cavities;
a pair of rigid holding tabs projecting substantially axially from said one face at opposite circumferential edges of each of said housings; and
an underdermable partition connecting the tabs of each pair of adjacent housings and being axially limited by a bottom of a corresponding one of said cavities,
whereby axial pressure on said pads deforms said ring such that a spacing between each said pair of tabs is enlarged to permit insertion of a bearing in a corresponding housing.

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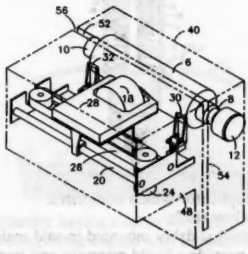
**5,035,521**

## ENVELOPE PRINTING MECHANISM

**Bernard D. Stone, Maple Glen, Pa., assignor to Addressease, Inc., Maple Glen, Pa.**

**Filed Feb. 6, 1990, Ser. No. 475,783**
**Int. Cl.[5] B41G *3/00*; B41J *5/30***
**U.S. Cl. 400—17** **8 Claims**



1. A printing mechanism for envelopes and the like, comprising:
a platen;
printing means comprising a print head located adjacent to the platen with sufficient clearance for effecting printing of characters along a printing line on the envelope inserted top first or bottom first entirely within a plane located between the print head and the platen;
first drive means for effecting print head movement in one direction relative to said platen with printing of each character;
second drive means for effecting envelope movement in one direction with printing of each line;
a housing containing the platen, printing means and drive means, the housing having first and second opposite end walls, a third wall extending from one end wall to the other and providing at least partial coverage of the print head and platen, and a fourth wall in a plane parallel to the third wall on the opposite side of the housing therefrom and adapted to rest on a horizontal surface for supporting the housing;
a slot in said third wall arranged to receive the envelope and to allow the envelope to be inserted in a flat condition between the print head and the platen;
a slot in one of the end walls meeting and continuous with the slot of the third wall and aligned with a plane tangent to the platen at the location of the printing line while the envelope is being printed by the print head, whereby the envelope being printed can extend outwardly from the housing through both slots;
said one of the end walls and the slot therein extending perpendicular to the third and fourth wall in a direction away from said third wall;
characterized by the fact that the elements of the printing mechanism are constructed and arranged to provide a clearance permitting an envelope to remain entirely in the flat condition in said plane tangent to the platen;
data buffer means for receiving the characters of an address to be printed, said data buffer means being selectably operable in a first-in, first-out sequence or in a last-in, first-out sequence;
means establishing two alternatively selectable character sets;
print head driving means, for receiving data from the data buffer means, the print head driving means being responsive to the character set-establishing means, and to said data buffer means, for printing characters on the envelope; and
switching means, controlling said character set establishing means and said data buffer means, for selecting one of said character sets and for selecting either a first-in, first-out sequence or a last-in, first-out sequence in said data buffer means;
whereby characters can be printed in a first-in, first-out sequence in one of said character sets, and alternatively in a last-in, first-out sequence in the other of said character sets.

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**5,035,522**

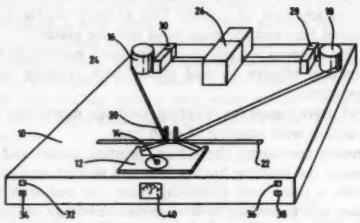
## RIBBON REINKING MACHINE

**John G. Wright, Bristol, United Kingdom, assignor to Inkwell (UK) Limited, Bristol, United Kingdom**

**Filed Jun. 11, 1990, Ser. No. 536,196**
**Claims priority, application United Kingdom, Jun. 9, 1989, 8913354**
**Int. Cl.[5] B41J *27/12***
**U.S. Cl. 400—197** **11 Claims**

1. A method of inking a ribbon comprising feeding the ribbon relative to an ink applicator and opto-electric sensing means generating a signal representative of the density of ink on the ribbon, comparing the said signal with a predetermined

threshold level representative of the desired ink density, and terminating the procedure when the comparison indicates that



substantially the entire length of the ribbon bears the desired ink density.

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**5,035,523**

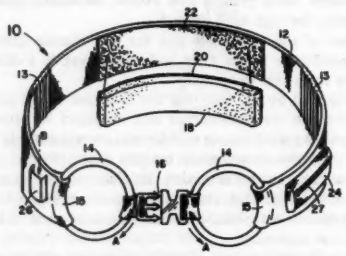
## MULTIPURPOSE BELT

**Michael F. Allinder, Rte. 4, Box 1442, Palatka, Fla. 32177**

**Filed May 21, 1990, Ser. No. 525,912**

**Int. Cl.[5] A46B *5/02*; B05B *1/00*; A47K *7/02***

**U.S. Cl. 401—6** **15 Claims**



1. A belt for holding and carrying objects, and for applying lotion and the like to the body of a user, comprising:

a strap for encircling a user's body for wearing as a belt;

a pair of handle rings, said rings attached to respective ends of said strap;

buckle means movably attached to said pair of rings for securing said strap around a user's body;

a resilient pad for holding lotion and the like, said pad attachable to a rear surface of said strap; and

at least one pocket attached to an outer surface of said strap for holding and carrying objects.

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**5,035,524**

## INSTRUMENTS FOR APPLYING A LIQUID COATING INCLUDING A WRITING INSTRUMENT, A COSMETIC APPLICATOR OR SIMILAR DEVICES

**Kiyokazu Sakurai, Kamiizumi, Japan, assignor to Mitsubishi Pencil Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 314,256, Feb. 24, 1989, abandoned, which is a continuation of Ser. No. 104,016, Oct. 5, 1987, abandoned. This application Dec. 1, 1989, Ser. No. 443,033**

**Claims priority, application Japan, Oct. 6, 1986, 61-153504[U]**

**Int. Cl.[5] B43K *8/04***

**U.S. Cl. 401—206** **3 Claims**

1. A liquid coating instrument for use as a writing instrument, a cosmetic applicator, or similar instrument which comprises:

(a) a shaft cylinder;

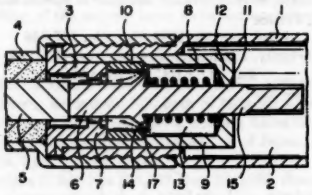
(b) a liquid storage part disposed in said cylinder in the rear portion thereof;

(c) a liquid coating applicator tip slidably mounted in said shaft cylinder at the front thereof;

(d) a chamber in said shaft cylinder between said liquid storage part and a valve unit to measure a predetermined quantity of liquid;

(e) a valve unit in said shaft cylinder to place said chamber in communication with said applicator tip;

(f) a spring means resiliently urging the valve unit to closed position;



(g) means for operating said valve unit so that when the valve unit is open to allow flow of liquid from said chamber to said liquid coating applicator tip, communication between the liquid storage part and the chamber is cut off; and

(h) a second means activated by depressing said applicator tip to open said valve unit and place said chamber in communication with said applicator tip to feed only a predetermined amount of liquid to said applicator tip at a time when there is no communication between said storage part and said chamber.

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**5,035,525**

## LIQUID APPLICATOR

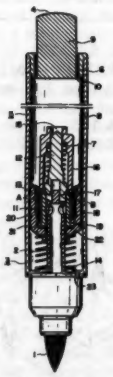
**Yoshiomi Konose, Fujioka, Japan, assignor to Mitsubishi Pencil Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 268,609, Nov. 7, 1988, abandoned, which is a continuation of Ser. No. 19,394, Feb. 26, 1987, abandoned. This application Nov. 30, 1989, Ser. No. 442,457**

**Claims priority, application Japan, Feb. 27, 1986, 61-29003[U]**

**Int. Cl.[5] A46B *11/00***

**U.S. Cl. 401—278** **2 Claims**



1. A liquid applicator which comprises:

a) a main hollow shaft;

b) an inner shaft slidably mounted in said main shaft, being hollow to provide a liquid reservoir and terminating at its rearward end in a push rod extending beyond said main shaft;

c) a liquid conduit secured to said main shaft and extending rearwardly through a neck of said inner shaft with an opening into the conduit adjacent its rearward end and its forward end being in communication with a liquid applicator;

d) a hollow casing extending rearwardly through the neck of said inner shaft;

e) a tubular element in said casing terminating at its rearward end in a valve seat;

f) a valve stem and body slidably mounted on a rear cylindrical end portion of said liquid conduit with its rearward end slidably mounted in said hollow casing and its forward end comprising a valve body for seating on said valve seat of said tubular element;

g) a lid member at the forward end of said inner shaft securing said tubular element and said casing to said inner shaft;

h) said liquid conduit having a projection at its rearward end slideably fitting into a closed bore on the forward end of the valve body, the opening into said liquid conduit being at a predetermined spaced distance from said valve seat whereby said valve body is not lifted from said valve seat until said hollow casing, tubular element, valve stem and body and inner shaft travel through a distance equal to said predetermined spaced distance;

i) a spring means between said hollow casing and said valve body to urge said valve body against the valve seat of said tubular body element; and

j) a second spring means between said lid member and an interim shoulder of said main shaft to urge said inner shaft in a rearward direction and return the movement of said push rod to its rearward position as well as to ensure that only positive movement of said inner shaft greater that said predetermined spaced distance would result in moving said valve body off of said valve seat to open said liquid conduit for communication between said reservoir and said applicator.

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**5,035,526**

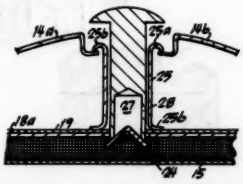
## CONCEALED RIVET ELEMENT AND SETTING METHOD FOR RING BINDER CONSTRUCTION

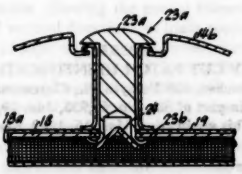
**Edward W. Cooper, and Peter Dewberry, both of Scarborough, Canada, assignors to Acco World Corporation, Wheeling, Ill.**

**Continuation-in-part of Ser. No. 349,017, May 8, 1989, abandoned. This application Sep. 13, 1990, Ser. No. 582,688**

**Int. Cl.[5] B42F *13/00***

**U.S. Cl. 402—75** **7 Claims**




1. In a ring binder having a spine and a ring mechanism, the improvement comprising a spine with an inside hard layer with a hole formed in it, an outside adjacent soft layer, and a fastener means for fastening the spine to the ring mechanism which fastener means includes an integrally formed head, stem and deformable end fastener element and an anvil located in the soft layer below said hole in the hard layer, the fastener element driven against the anvil to deform its end to the extent it is not able to pass through the hole.

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**5,035,527**

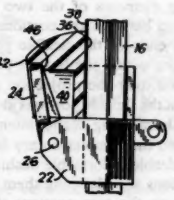
## LOCKING BODY

**Far Cheng, 155 Liteh Street, Taichung City, Taiwan**

**Filed Jan. 29, 1990, Ser. No. 471,771**

**Int. Cl.[5] F16B *7/10***

**U.S. Cl. 403—109** **3 Claims**




1. A locking body adapted to be utilized in association with an engagement device mounted to an elongated member of consistent cross-section along at least a portion of its length adjacent the engagement device, the engagement device including an operating arm element having a free end with an operative position generally parallel to the longitudinal axis of the elongated member and displaced from the surface thereof, said locking body comprising a pair of opposed legs mounted to a main body portion, said legs being adapted to embrace said elongated member with a sliding frictional fit; said main body portion having a cavity formed in the interior thereof through a side wall and a top wall thereof, said cavity having a bottom bounded by a cavity side wall and a peripheral shoulder, said cavity being dimensioned to accept said free end of said operating arm, said free end being embraced and surrounded by said cavity side wall and being positioned and supported above said bottom upon said peripheral shoulder when said locking body is slid into an abutting relationship with said engagement device.

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**5,035,528**

## CONNECTOR WITH LOCKABLE BUSHING

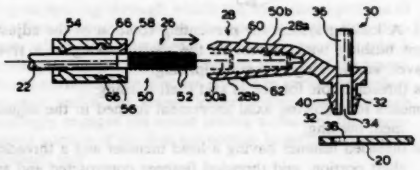
**Cirillo L. Costantino, Castro Valley; David P. Chengson, Mountain View; Duc N. Le, Santa Clara; Lordson L. Yue, Sunnyvale; Aurangzeb K. Khan, Cupertino, all of Calif., Aurora, Canada, assignor to KTM Locks CMT Group Division of Magna International Inc., Concord, Canada**

**Continuation of Ser. No. 412,626, Sep. 27, 1989, abandoned, which is a continuation of Ser. No. 164,404, Mar. 4, 1988, abandoned. This application May 21, 1990, Ser. No. 526,537**

**Claims priority, application Canada, Mar. 6, 1987, 531448**

**Int. Cl.[5] F16B *7/04***

**U.S. Cl. 403—290** **16 Claims**




1. A connector for connector for connecting two members together, the connector comprising two components, a male component and a female component, the female component comprising securing means for securing the male component to one member and comprising at least a pair of flexible portions spaced from one another and moveable towards one another to

provide a space therebetween of substantially uniform cross-section and away from one another and each flexible portion having spaced ends and carrying fastening elements between the ends, each element of the same configuration on the surfaces of the portions closest the other portion, the male component comprising a projection of substantially uniform cross-section having a leading and rearward end and carrying complementary fastening elements, of a complementary configuration to the fastening elements on the surfaces of the portions closest the other portion of the female component, on the outer surface of the projection proximate the leading end for mating with the fastening elements of the two portions when the projection is pushed between the portions and positioned between the spaced ends of the flexible portions at one of a plurality of positions within the flexible portions and the portions being clamped over the projection to thereby lock the projection between the flexible portions at one of a plurality of positions by the intermeshing of the fastening elements on the flexible portions and the complementary fastening elements of the projection, slideable deformable bushing means for riding over the two portions and clamping them over the projection and being locked on the two portions thereby providing a secure connection between the male and female components, the deformable bushing means having locking means disposed therewith for engaging detent means with the female component when the bushing means is slid over the two portions, and means connected to the rearward end of the male component.

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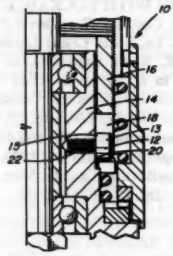
**5,035,529**

## RIVET SHAVER ROTATIONAL LOCKING SYSTEM

**Phil Snider, R.R. #1, Hicksville, Ohio 43526**

**Filed Aug. 7, 1989, Ser. No. 390,146**
**Int. Cl.[5] F16D *1/00***
**U.S. Cl. 403—24** **3 Claims**




1. A locking system for preventing rotation of the adjustment bushing with respect to the shaft housing in a rivet shaver, said locking system comprising:

a threaded hole formed in said shaft housing;

means for allowing axial movement formed in the adjustment bushing;

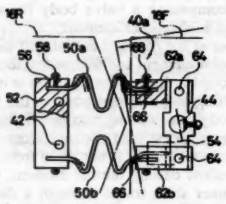
a threaded fastener having a head member and a threaded shaft portion, said threaded fastener constructed and arranged so that said head member passes through said means for allowing axial movement in the adjustment bushing and said threaded shaft threadably engages the shaft housing and is retained in place by the frictional engagement of the headed portion of said threaded fastener with the shaft housing.

**5,035,530**

## ACTUATOR UTILIZING SHAPE MEMORY ALLOY AND ARTICULATED ARM COMPRISING THIS ACTUATOR

**Toshio Fukuda, Hara, and Masanori Kanashige, Yokohama, both of Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan**

**Filed Oct. 16, 1989, Ser. No. 421,834**
**Claims priority, application Japan, Oct. 17, 1988, 63-259491**
**Int. Cl.[5] F16D *1/00***
**U.S. Cl. 403—404** **17 Claims**




1. An actuator utilizing a shape memory alloy, comprising:

two bodies capable of relative displacement,

a plate-shaped output member comprising a shape memory alloy, the output member having two attachment ends and the attachment ends having respective attachment points,

attachment means for attaching both the attachment ends of the output member to the two bodies, respectively, and

a heating device for controlling the temperature of the output member, the heating device comprising a nichrome wire wound around the output member,

wherein the output member comprises a shape memory alloy having such memory characteristics that a predetermined wave plate shape having at least one wave extending in the direction substantially orthogonal to the line connecting the attachment points of the two attachment ends of the output member is formed in a predetermined temperature region, and relative displacement is caused between the two bodies by the force of retaining the memorized wave plate shape according to changes of the temperature.

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**5,035,531**

## UTILITY CUT PATCH IDENTIFICATION TAG

**Richard E. Sanchez, 409 Forsyth Pl., Claremont, Calif. 91711**

**Continuation-in-part of Ser. No. 67,935, Jun. 29, 1987, Pat. No. 4,888,896. This application Mar. 16, 1989, Ser. No. 324,567**
**Int. Cl.[5] E01F *9/06, 9/08***
**U.S. Cl. 404—12** **20 Claims**

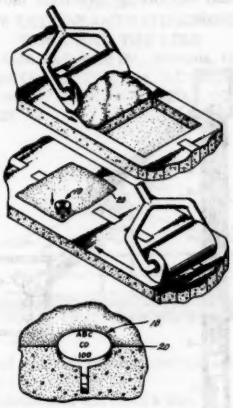
1. A utility cut patch identifying tag comprising:

a generally flat plate of a durable material having upper and lower surfaces;

at least two barbed legs extending from the lower surface of the plate;

a plurality of gussets, each gusset being integral with a leg and the lower surface of the plate; and

at least one labeling indicia on the upper surface of the plate;



wherein the tag is capable of being embedded into fresh paving material.

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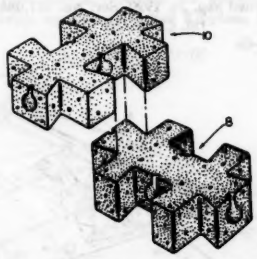
5,035,532

## METHOD AND APPARATUS FOR CONSTRUCTING AN ARTICULATED PAVEMENT SYSTEM

Roberto L. Gargollo, Alpes 650, Lomas de Chapultepec 11000, Mexico

Continuation-in-part of Ser. No. 148,714, Jan. 26, 1988, Pat. No. 4,850,739. This application Jun. 15, 1989, Ser. No. 366,764
Claims priority, application Mexico, Jan. 16, 1989, 14563
Int. Cl.[5] E01C 5/00
U.S. Cl. 404—41 8 Claims



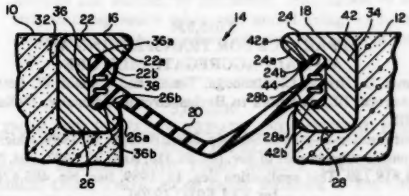
1. A constructive system comprising a multiplicity of rigid identical modular units to form a one layer simple structure having clearance joints, allowing the partial transmission, in both horizontal and vertical directions, of loads applied on one or more said units to adjacent units, said system further comprising said identical modular units each having flat, continuous, horizontal upper and lower faces and smooth outer sides, said sides further provided with interlocking lobes and lob e receiving spaces, said modular units interlockable by placing a lobe of one of said units in one lobe receiving space of another adjacent unit, said interlocked structure providing said clearance joints among each of said interlocked units and said adjacent ones whereby a movement of said units is obtained when loads are applied to them, said movement allowing only said partial transmission of the stress among said units without affecting said interlocking of said units of said structure.

5,035,533

## HIGHWAY EXPANSION JOINT STRIP SEAL

Howard R. Brown, Bowling Green, Ohio, assignor to D. S. Brown Company, Inc., North Baltimore, Ohio

Continuation-in-part of Ser. No. 272,529, Nov. 17, 1988, Pat. No. 4,896,994. This application Jan. 24, 1990, Ser. No. 469,220
Int. Cl.[5] E01C 11/10
U.S. Cl. 404—64 24 Claims




1. A strip seal for use between the spaced apart ends of adjacent sections of a highway, bridge, or the like, said strip seal comprising:

a membrane, said membrane comprising;

a web portion having first and second opposed edges,

a first ear portion attached to the first of the opposed edges of the web portion,

a second ear portion attached to the second of the opposed edges of the web portion,

each of the first ear portion and the second ear portion extending generally normally to the web portion and having an enlarged end portion and a transitional portion attached to said enlarged end portion and positioned between said enlarged end portion and the edge of the web portion to which said each of the first ear portion and the second ear portion is attached,

each transitional portion having a flat plannar upper sealing surface and a flat planar lower sealing surface,

the upper sealing surface of each transitional portion having a finite width and being below an upper limit of the enlarged end portion to which said transitional portion is attached,

the lower sealing surface of each transitional portion having a finite width and being above a lower limit of the enlarged end portion to which said transitional portion is attached, and

each transitional portion further being attached to the edge of the web portion to which the ear portion incorporating said transitional portion is attached at a location on said transitional portion which is substantially closer to one of the upper sealing surface and the lower sealing surface thereof than to the other;

a first elongate rail, said first elongate rail being formed from a rigid material and having an internal cavity which is generally C-shaped in transverse cross section, the free end of the first ear portion of the membrane being snugly contained in said internal cavity, said internal cavity having an opening through which the transitional portion of the first ear portion passes, the opening of the first elongate rail having a flat planar upper sealing surface which sealingly engages the upper sealing surface of the transitional portion of the first ear portion in surface to surface contact and a flat planar lower sealing surface which sealingly engages the lower sealing surface of the transitional portion of the first ear portion in surface to surface contact; and

a second elongate rail, said second elongate rail being formed from a rigid material and having a second internal cavity which is generally reverse C-shaped in transverse cross section, the free end of the second ear portion being snugly contained in said second internal cavity, said second internal cavity having an opening through which the transitional portion of the second ear portion passes, the

opening of the second elongate rail having a planar upper sealing surface which sealingly engages the upper sealing surface of the transitional portion of the second ear portion and a flat planar lower sealing surface which sealingly engages the lower sealing surface of the transitional portion of the second ear portion in surface to surface contact;

the flat planar upper sealing surface and the flat planar lower sealing surface of each of said first elongate rail and said second elongate rail having a finite width.

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**5,035,534**

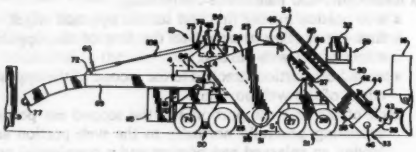
## APPARATUS FOR TRANSFERRING AN ASPHALT-AGGREGATE MIXTURE

**James D. Brock, Chattanooga, Tenn., and Donald W. Smith, Aurora, Ill., assignors to Barber-Greene Company, DeKalb, Ill.**

**Continuation-in-part of Ser. No. 309,079, Feb. 10, 1989, which is a continuation-in-part of Ser. No. 89,318, Aug. 25, 1987, Pat. No. 4,818,139. This application Sep. 11, 1989, Ser. No. 405,426**

**Int. Cl.[5] E01C *19/00***

**U.S. Cl. 404—81** **3 Claims**



1. An apparatus for receiving an asphalt-aggregate material comprising:

(a) chassis means including ground engaging mobile support means and steering means for at least a part of the support means;

(b) motive power means carried by said chassis means and connected to at least a part of said support means;

(c) hopper means mounted on said chassis means in substantial symmetrical relationship with the longitudinal centerline of the chassis means;

(d) conveyor means mounted on said chassis means for transporting the asphalt-aggregate material longitudinally of said chassis means from said hopper toward the rear of said apparatus; and

(e) transversely disposed screw auger means mounted in the lower portion of said hopper means for delivering the asphalt-aggregate material from the lateral extremities thereof to the central portion of said hopper means wherein said screw auger means has a first pair of screw sets at the outer ends of the auger means and at least a second pair of screw auger sets inwardly of the first pair of screw sets, the second pair of screw sets having a pitch greater than the pitch of the first pair of screw sets for allowing the asphalt-aggregate material at the center portion of the hopper means to combine with the material transported by the first set of screw sets from the transverse extremities of the hopper means.

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**5,035,535**

## DEVICE FOR REGULATING THE FLOW IN A DRAINAGE SIPHON TUBE

**Jean-Claude Gress, Fontaines, France, assignor to Gress S.A., Fontaines, France**

**Filed Jun. 1, 1990, Ser. No. 532,031**

**Claims priority, application France, Jun. 2, 1989, 89 07561**

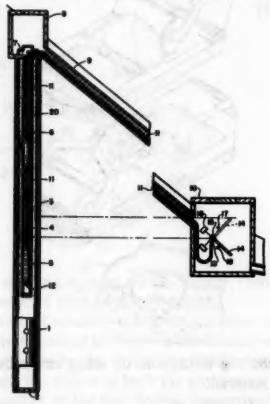
**Int. Cl.[5] E02B *11/00***

**U.S. Cl. 405—50** **5 Claims**

1. A device for regulating the flow in a drainage siphon tube assembly of the type having a siphon tube with an inlet end and an outlet end, and at least one drain support tube arranged within a drainage borehole having a lower end defining a reservoir with a top lip disposed at the same altitude level as said siphon tube outlet end, comprising:

a support disposed adjacent said siphon tube outlet end;

means for pivotably mounting said outlet end of said siphon tube on said support for pivotable movement about a horizontal axis;



a rigid tube having one free end and an opposite end coupled to said outlet end of said siphon tube; and

a counterweight cooperating with said outlet end of said siphon tube to cause the free end of said rigid tube to pivot upwardly to a predetermined high point when there is no flow and to alternatively pivot downwardly to a predetermined low point when there is a flow.

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**5,035,536**

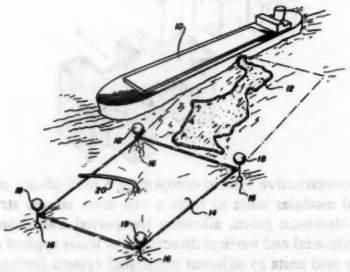
## OIL SPILL RETRIEVAL SYSTEM

**Emil H. von Winckelmann, 3108 Blossom La., Redondo Beach, Calif. 90278**

**Filed Sep. 24, 1990, Ser. No. 587,084**

**Int. Cl.[5] E02B *15/04***

**U.S. Cl. 405—60** **2 Claims**



1. An oil spill retrieving system for retrieving oil from the surface of a body of water comprising: a sheet adapted to be spread on the surface of the body of water to extend over at least a section of the oil on the surface of the body of water; a plurality of weights attached to the peripheral edge of said sheet; a corresponding plurality of air bags attached to respective ones of the weights for holding said sheet on the surface of the body of water when the bags are inflated and for preventing the weights from sinking when the air bags are inflated, and for permitting the weights to sink when the air bags are deflated to cause the weights to draw the peripheral edge of the

sheet down into the body of water to form the sheet into a canopy over the oil in the section to trap the oil within the canopy; and a hose extending through the sheet to enable the oil trapped in the canopy to be retrieved.

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**5,035,537**

**METHOD OF DECONTAMINATING SOIL, POROUS ROCK AND THE LIKE**

**James L. Rose, 4654 Vicksburg Dr., Sylvania, Ohio 43560**

**Filed Oct. 12, 1990, Ser. No. 596,692**

**Int. Cl.[5] B09B *3/00*; E02D *3/00***

**U.S. Cl. 405—128** **20 Claims**

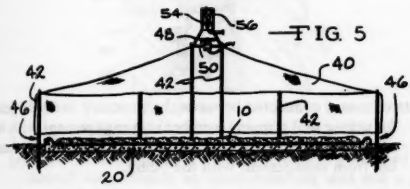


FIG. 5

1. A method of treating contaminated soil and the like comprising the steps of:

removing contaminated soil from a site,

providing a fluid impervious surface for receiving said contaminated soil,

dispersing said contaminated soil on said fluid impervious surface at a thickness of at least about four inches,

applying an emulsifier/water solution to said soil,

allowing said emulsifier/water solution treated soil to remain on said surface for at least about 24 hours,

whereby contamination in said soil is volatilized by said emulsifier/water solution.

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**5,035,538**

**ARCUATE PRECAST TUNNEL LINING SEGMENTS**

**Samuel B. H. Mitchell, Staines, United Kingdom, assignor to Costain Building Products Limited, Kirkby-In-Ashfield, England**

**Filed Mar. 8, 1990, Ser. No. 490,440**

**Claims priority, application United Kingdom, Mar. 8, 1989, 8905319**

**Int. Cl.[5] E21D *11/00***

**U.S. Cl. 405—151** **7 Claims**

1. An arcuate tunnel-lining segment having two angularly spaced, longitudinally and radially extending opposite first ends, two axially spaced, angularly and radially extending opposite second ends, and radially spaced inner and outer surfaces bounded by said ends, said segment comprising:

a body of precast concrete bounded by said ends and said surfaces;

an axially extending packing strip of laterally compressible material, said strip being embedded in said body of precast concrete so as to extend axially of said body from one of said second ends to the other of said second ends at a location which is intermediate said first ends; said strip also extending radially from said outer surface to said inner surface, thereby dividing said body into two angularly adjoining segment parts separated from one another by said strip and having corresponding faces engaging said strip;

a plurality of connecting means each having a central portion penetrating laterally through said strip, and two opposite end portions embedded in said body; said connecting means thereby holding said segment parts together with said faces thereof in confronting alignment with one another against laterally opposite faces of said strip while permitting movement of said faces of said segment parts towards one another by permanent deformation of said strip in compression when said tunnel lining segment is subjected in use to excessive external compressive loading.

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**5,035,539**

**LINER FOR PIPELINE REPAIR AND METHOD FOR REPAIRING PIPELINES**

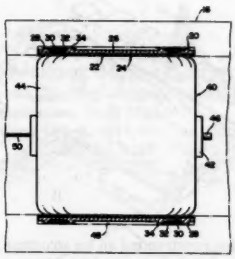
**Takayuki Kawafuji, Tokyo; Toshio Akesaka, Yokohama, and Sinkiti Ooka, Tokyo, all of Japan, assignors to Toa Grout Kogyo Kabushiki Kaishi and Kabushiki Kaisha Iseki, both of Tokyo, Japan**

**Filed Aug. 13, 1990, Ser. No. 566,752**

**Claims priority, application Japan, Aug. 14, 1989, 1-207839; Dec. 4, 1989, 1-313404; Mar. 15, 1990, 2-64633**

**Int. Cl.[5] F16L *1/025***

**U.S. Cl. 405—154** **19 Claims**



1. A liner for repairing a pipeline disposed on an inner surface of a pipe defining said pipeline, comprising:

an elastically deformable sleeve having impermeability;

a base having a sheet-like base portion disposed inside said sleeve in a radially expandable, wound cylindrical form; and

fixing means disposed on said base and for maintaining said base portion in a substantially cylindrical form when said base portion is expanded radially within said sleeve.

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**5,035,540**

**SHALLOW WATER PIPELINE TRACKER SYSTEM**

**Robert M. Hill, Boling, and Gordon Barksdale, Webster, both of Tex., assignors to Eastport International, Houston, Tex.**

**Filed Sep. 12, 1990, Ser. No. 581,736**

**Int. Cl.[5] F16L *1/12***

**U.S. Cl. 405—157** **6 Claims**

1. A method of measurement to establish the burial depth and location of a pipeline buried beneath the bottom in shallow water comprising the steps of

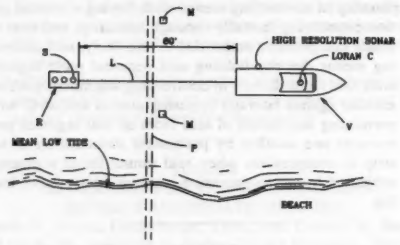
(a) locating the ends of the length of pipeline to be measured;

(b) selecting a plurality of spaced points along the pipeline intermediate of the located ends;

(c) marking such spaced points with buoys or other markers visible at the surface of the water;

(d) positioning a moveable vehicle having an array of magnetic pipe sensors carried thereon near the pipeline adjacent to one of its located ends;

(e) moving said vehicle and array of magnetic pipe sensors across the pipeline adjacent to the spaced points; and




(f) recording the burial depth of the pipeline adjacent each such spaced marker.

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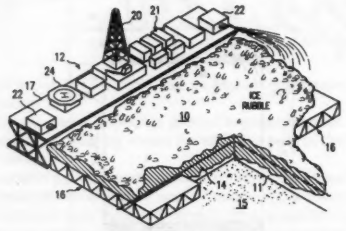
**5,035,541**
**RUBBLE-SPRAY ICE ISLAND**
**Kailash C. Gulati, and Anton Prodanovic, both of Dallas, Tex., assignors to Mobil Oil Corporation, Fairfax, Va.**
**Filed Jul. 30, 1990, Ser. No. 560,534**
**Int. Cl.[5] E02B *17/00***
**U.S. Cl. 405—217** **20 Claims**




1. A method for constructing an ice structure in deep, arctic waters having a moving sheet of ice thereon, said method comprising:

positioning a rubble generator in the path of said moving sheet of ice;

raising a portion of the marine bottom adjacent to and on the upstream side of said rubble generator;

allowing ice rubble to accumulate as it is generated by said sheet of ice moving against said rubble generator and to spontaneously ground onto said raised portion to form a grounded pile of ice rubble; and

accumulating additional ice onto said grounded pile of ice rubble to form said ice structure.

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**5,035,542**
**APPARATUS AND METHOD FOR RELEASABLE CONNECTIONS**
**Max Bassett, 926 Coachlight Dr., #422, Houston, Tex. 77077**
**Continuation-in-part of Ser. No. 147,976, Jan. 25, 1988, Pat. No. 4,867,612. This application Jun. 15, 1988, Ser. No. 207,289**
**The portion of the term of this patent subsequent to Sep. 19, 2006, has been disclaimed.**
**Int. Cl.[5] E02B *17/02***
**U.S. Cl. 405—227** **42 Claims**

1. An apparatus for releasably connecting a structure to a piling, comprising:

a gripping member for releasably engaging the piling;

a joint connected to said gripping member, said joint operable to orient said gripping member vertically and horizontally with respect to the piling, whereby vertical and rotational reaction force are transmitted from the piling to the structure; and

drive means connected between the structure and said joint for urging said gripping member into engagement with the piling and for selectively withdrawing said gripping member from engagement with the piling.

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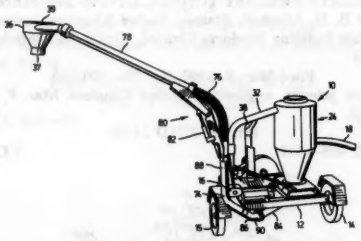
**5,035,543**
**MATERIAL TRANSFER APPARATUS**
**John J. Medemblik, and William Devries, both of Fergus, Canada, assignors to Walinga Inc., Guelph, Canada**
**Filed Jul. 10, 1989, Ser. No. 377,374**
**Int. Cl.[5] B65G *53/28***
**U.S. Cl. 406—39** **24 Claims**



1. An outlet conduit for use in material transfer apparatus comprising hollow tubing and having:

(a) first, second and third sections, the substantially rigid first section leading from a material inlet to the flexible, curved second section, the second section being rotatably connected to an upright end portion of the first section and the substantially rigid third section leading from the second section towards a material outlet;

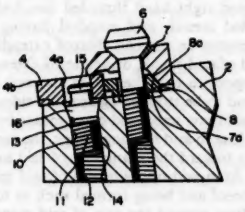
(b) a hinge member connecting the first and second sections, the hinge member comprising a first member extending from the first section and a second member extending from the third section, the first and second members being pivotally connected at two pivot points located laterally of the second section the members being configured to permit positioning of the second section between said pivot points, and the first member including a sleeve portion rotatably mounted on an end portion of the first section; and

(c) setting means for setting the angle between the first and third sections.

## 5,035,544
## INSERT CLAMPED TOOL

Kouichi Ikenaga, and Tatsuo Arai, both of Tokyo, Japan, assignors to Mitsubishi Metal Corporation, Tokyo, Japan

Filed May 17, 1990, Ser. No. 524,473
Claims priority, application Japan, May 19, 1989, 1-57625[U]
Int. Cl.[5] B23B *27/16*
U.S. Cl. 407—105 2 Claims



1. A clamped tool having an insert comprising:

(a) a tool holder including a recess formed at a forward end thereof and defining an insert-receiving seat and a pin-receiving hole formed therein so as to open to said insert-receiving seat, said pin-receiving hole having an internally threaded portion and a tapered portion disposed adjacent to said internally threaded portion so as to taper in a direction away from said insert-receiving seat;

(b) a positioning pin releasably received in said pin-receiving hole of said tool holder and having an engaging portion formed at one end thereof and disposed so as to protrude from said insert-receiving seat, said positioning pin having an externally threaded portion that threadedly engages with said internally threaded portion of said pin-receiving hole and a tapered portion disposed adjacent to said externally threaded portion so as to taper in a direction away from said insert-receiving seat, said tapered portion being held entirely in intimate contact with said tapered portion of said pin-receiving hole;

(c) a cutting insert having a mounting bore formed therethrough and received on said insert-receiving seat in such a manner that said engaging portion of said positioning pin is held in abutting engagement with said mounting bore of said insert; and

(d) clamp means including a pressing member disposed on said insert-receiving seat so as to be movable toward and away from said insert, a clamp arranged on said pressing member for pressing said insert against said insert-receiving seat and pressing said pressing member against said insert and a clamp screw screwed into said tool holder for fixedly securing said clamp on said tool holder.

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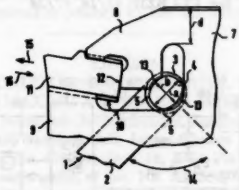
## 5,035,545
## HOLDER FOR CUTTING TOOL INSERTS

Karl Zinner, Nuremberg, Fed. Rep. of Germany, assignor to Zinner GmbH Prizisionswerkzeuge, Nuremberg, Fed. Rep. of Germany

Filed Feb. 26, 1990, Ser. No. 485,091
Claims priority, application Fed. Rep. of Germany, Mar. 3, 1989, 3906822
Int. Cl.[5] B23P *15/28*
U.S. Cl. 407—110 18 Claims

1. A holder device for a cutting tool insert comprising a holder member having a slot which separates two spaced jaws, said jaws receiving and clamping said insert, said two spaced jaws having opposed arcuate surfaces arranged such that said jaws are opened by initially inserting an opening tool having an oval cross-sectional configuration between said opposed arcuate surfaces of said spaced jaws with the closely spaced opposed sides of the opening tool disposed opposite said opposed surfaces of said jaw and then rotating said opening tool so that the widely spaced opposed sides of said opening tool are disposed opposite said opposed arcuate surfaces of said jaw, said closely spaced opposed sides of said opening tool being spaced from one another a first diametrical distance, said widely spaced opposed sides of said opening tool being spaced from one another a second diametrical distance, said second diametrical distance being greater than said first diametrical distance,



said opposed arcuate surfaces of said jaws being spaced from one another a third diametrical distance when in a natural unsprung state, said third diametrical distance being greater than said first diametrical distance and less than said second diametrical distance.

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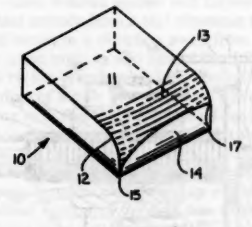
## 5,035,546
## RADIUSED ON-EDGE INDEXABLE CUTTING INSERT

James A. Pawlik, Sterling Heights, Mich., assignor to GTE Valenite Corporation, Troy, Mich.

Filed Oct. 1, 1987, Ser. No. 103,464
Int. Cl.[5] B23B *27/16*
U.S. Cl. 407—116 15 Claims

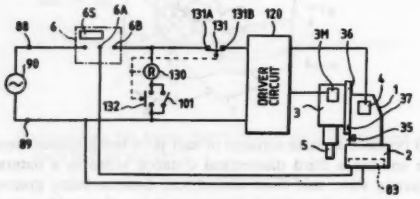


1. On-edge indexable insert for cutting arcuate corners comprising parallel seating and exposed faces, four sides extending between said faces, an arcuate cutting edge oriented at the intersection of at least two of said four sides, and an arcuate surface with compound convex curvature extending backwardly from said arcuate cutting edge, said arcuate surface intersecting a planar side surface having a minimum dimension at said cutting edge increasing to a maximum intermediate dimension and diminishing toward the trailing edge to provide a planar locating surface for abutment in an insert pocket of a tool when said cutting edge is indexed to an inactive position.

## 5,035,547
## MAGNET BASE DRILL UNIT

Michihiro Shoji, Tokyo, Japan, assignor to Nitto Kohki Co., Ltd., Tokyo, Japan

Filed May 24, 1990, Ser. No. 528,745
Claims priority, application Japan, Jun. 15, 1989, 1-153517
Int. Cl.[5] B23B *45/14, 47/24*
U.S. Cl. 408—6 7 Claims




1. In a magnet base drill unit comprising a frame having a magnet base causing the drill unit to be magnetically adhered onto a workpiece, an electric drill having a drill motor, and a feed motor fixed to the frame for advancing the electric drill toward the workpiece, the magnet base drill unit including means for detecting the sliding of the drill unit comprising a vibration responsive switch, which is fixed to the frame and actuated in response to a vibration due to the sliding of the magnet base drill unit, and a power supply release means responsive to the output of the slide detection means for stopping the supply of power to the electric drill and the feed motor.

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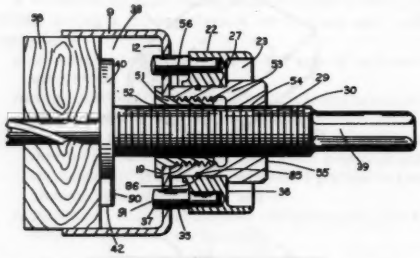
## 5,035,548
## HOLE SAW DRIVER AND EXTRUDER

Joseph A. Pidgeon, 2920 N. Deer Track, Tucson, Ariz. 85749

Filed Oct. 31, 1990, Ser. No. 606,772
Int. Cl.[5] B23B *51/05;* B23Q *11/02*
U.S. Cl. 408—68 14 Claims




1. A device for driving and extruding sawed material from a hole saw, which saw has an irregular hole formed centrally through the base thereof and openings through the base around the irregular hole, comprising:

(a) an irregular flanged bushing formed to fit into said irregular hole and to maintain the bushing hole concentric with said saw, having external threads concentric with said bushing hole formed on at least portions thereof, and said bushing being inserted into said irregular hole with the flange thereof being rested against the inner face of said saw base;

(b) a flanged cylindrical shank having a threaded hole axially in the unflanged end thereof adapted to engage the threads on said bushing, a smaller hole axially through the flanged end thereof into said threaded hole, said shank being threaded onto said bushing against said saw base;

(c) threaded means for supporting a right hand threaded mandrel axially in said bushing and shank and for cooperating with said threaded mandrel;

(d) a collar freely mounted on said shank for reciprocating thereon and having projections extending equidistantly therefrom through said openings into said saw, the ends of said projections formed to define portions of helixes around the axis of said collar through said ends having the helical direction and at least as large pitch as has said threaded means; and

(e) an elongated right hand threaded mandrel engaged in said threaded means, said mandrel having a shank of smaller diameter on the end thereof extending from the flanged end of said shank, drive means extending radially from the opposite end thereof in the saw arranged to interpose and to be stopped against the sides of said projections in said saw upon said drive means being helically advanced close to said bushing flange, the surfaces of said drive means toward the shank end of said mandrel being equidistant from said opposite end of said mandrel along the axis thereof and being formed such as to define portions of helixes around the axis of said mandrel through said surfaces having the helical direction and at least as large pitch as has the thread of said mandrel; whereby, with said collar rested against said shank flange, said mandrel being threaded shank end forward in said threaded means until said drive means are stopped against said projections, said collar being moved on said shank to rest against said saw base, said projections thereby being moved sufficiently into said saw to intersect the helical paths defined by said drive means upon said drive means being helically advanced close to said bushing flange and such that said drive means contact and work against said projections to transfer torque for sawing from said mandrel to said saw during right hand rotation of said mandrel shank, and whereby, with said collar being moved on said shank to rest against said shank flange, said mandrel being free to cooperate with said threaded means to be threaded out through said saw for said opposite end thereof to extrude sawed material from within said saw.

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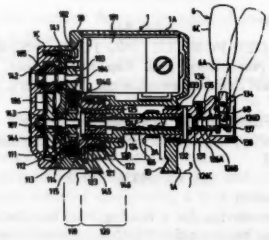
## 5,035,549
## BORING APPARATUS

Osamu Asano; Michihiro Shoji, and Masunari Kowada, all of Tokyo, Japan, assignors to Nitto Kohki Co., Ltd., Tokyo, Japan

Filed Jun. 19, 1990, Ser. No. 540,494
Claims priority, application Japan, Jun. 23, 1989, 1-73941[U]
Int. Cl.[5] B23B *47/18*
U.S. Cl. 408—132 8 Claims



1. A boring apparatus including a frame having a magnetic base to be magnetically adhered to a workpiece, an electric drill having a drill motor, a feed motOr fixed tO the frame, a reduction gear mechanism connected to the output of the feedmotor, a driving shaft for rising/falling of the electric drill connected to the output means of the reduction gear mechanism through a clutch means, and a manual handle for rising-/falling of the electric drill being provided on the driving shaft, the clutch means comprising:

a cylindrical body having a plurality of through-hole portions formed in the circumferential direction thereof and being provided in one of the output means of the reduction gear mechanism and one end of the driving shaft,

spherical bodies placed in the plurality of the through-hole portions in the cylindrical body,

an engagement member having a plurality of elongate concave portions formed in the direction of the axis of the driving shaft so as to oppose to and to engage with the spherical bodies, and being provided on the other of the output means of the reduction gear mechanism and the one end of the driving shaft, and

a spherical body pressing means being slidable to a first and a second positions in the axial direction of the driving shaft and having an annular groove which is faced to the through-hole portions to receive the spherical bodies therein at the first position thereby the clutch iS disconnected and is not faced to the through-hole portions to press the spherical bodies against the elongate concave portions at the second position thereby the clutch is connected.

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**5,035,550**

## HOLE SAW

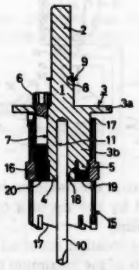
**Kunio Ajimi, Higashiosaka, Japan, assignor to House B. M. Co., Ltd., Higashiosaka, Japan**

**Filed Sep. 25, 1990, Ser. No. 587,404**

**Claims priority, application Japan, Oct. 11, 1989, 1-118851[U]**

**Int. Cl.[5] B23B *51/04***

**U.S. Cl. 408—204** **8 Claims**




1. A hole saw including in combination a shank having a drive collar at the front end of a drive shaft, a hole saw body having a base perpendicular to the axis thereof, and mounting means for removably attaching the base of the hole saw body to the drive collar of the shank, said hole saw comprising:

a. said drive collar of the shank being formed substantially integrally with the drive shaft;

b. a cylindrical boss projecting from the front side of said drive collar and having a diameter smaller than said drive collar and coaxial with the shank, said drive collar having a bolt receiving through-hole bored therein at a position radially spaced from said boss which is parallel to the axis of the shank;

c. a bolt received in said bolt receiving through-hole, said bolt having a length such that a threaded portion of the bolt projects beyond the front side of the drive collar when the bolt is inserted into the bolt receiving through-hole until its head engages the rear side of the drive collar;

d. the base of said hole saw body having a center hole bored centrally therein for receiving the boss projecting from the front side of said drive collar, said base further having at least one threaded hole bored therein at a position radially spaced from said center hole for receiving the threaded portion of the bolt extending through said bolt receiving through-hole;

e. whereby, when said center hole in the base of the hole saw body is engaged by said boss projecting from the front side of the drive collar and when the threaded portion of the bolt received in the bolt receiving through-hole of the drive collar is brought in thread engagement with said threaded hole in the base of the hole saw body, said base of the hole saw body goes in close contact with the front side of the drive collar so that the hole saw body can be firmly retained in position by the drive collar.

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**5,035,551**

## METHOD, CHUCK AND ROTARY TOOL TO BE USED WHEN MAKING A HOLE IN A WORKPIECE

**Harald P. G. Neumann, Julita, Sweden, assignor to Tryckluftteknik Harald Neumann AB, Julita, Sweden**

**Division of Ser. No. 674,341, Nov. 16, 1984, Pat. No. 4,589,310, which is a continuation of Ser. No. 304,551, Sep. 21, 1981, abandoned. This application Oct. 4, 1985, Ser. No. 784,715**

**Int. Cl.[5] B23B *51/10***

**U.S. Cl. 408—224** **2 Claims**

1. A twist drill bit having helical clearance surfaces and a centrla axis and a forward end, for use with a chuck, there being a recess spaced from said forward end of the drill, said helical clearance surfaces extending on both sides of said recess lengthwise of said axis, said drill bit being of uniform overall cross-section except at said recess, said recess extending about a portion of the drill bit periphery, said recess extending along a portion of the drill bit length, there being arranged at least at an end of the recess situated nearest said forward end a fixed cutting edge that extends from a said clearance surface to the bottom of said recess in a direction away from said forward end and at an acute angle to said axis of the drill bit, thereby when the drill bit has been brought into controlled revolution about a centerline of a hole bored through a workpiece, said revolution being such that in revolution said central axis forms a surface of an imaginary cylinder, said drill bit also rotating on its central axis, the cutting edge provides chamfering of the hole edge which is situated on that side of said workpiece which faces away from the drill bit before starting boring, the entire longitudinal section of the drill bit, which is intended during chamfering to be within the hole bored by the drill, and including the longitudinal section of the drill beyond both ends of said recess, being situated within, or at most touching an imaginary cylindrical surface having its center on said axis, said cylindrical surface having a radius equal to that of the drill bit.

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**5,035,552**

## TWIST DRILL FOR DEEP HOLE DRILLING

**Viktor G. Lysenko, prospekt Masherova, 47, korpus 1, kv. 278, and Lev G. Yudovin, ulitsa Uralskaya, 10, kv. 26, both of Minsk, U.S.S.R.**

**PCT No. PCT/SU88/00193, § 371 Date May 25, 1990, § 102(e) Date May 25, 1990, PCT Pub. No. WO90/03238, PCT Pub. Date Apr. 5, 1990**

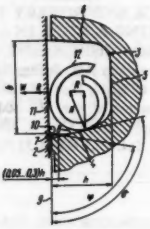
**PCT Filed Sep. 29, 1988, Ser. No. 490,647**

**Int. Cl.[5] B23B *51/02***

**U.S. Cl. 408—230** **3 Claims**

1. A twist drill for deep hole drilling, comprising a cutting portion, margins and helical flutes designed for chip removal,

each of said flutes is arranged at an angle relative to the twist drill axis front-end wall nearest the cutting portion of the drill and is conjugated with a flute bottom which is parallel with the twist drill axis and which is conjugated with a rear-end wall, said front-end wall comprising two conjugate sections, the first section intersecting with the margin to thereby form, with the generatrix of the twist drill outer cylindrical surface, an angle of less than 90°, while the angle of inclination of the tangent at any point of the two conjugate sections of the front-end wall,



to the generatrix of the twist drill outer cylindrical surface is selected from the relationship:

$$125° > \text{angle of inclination} > (57° - w)K + 90°,$$

wherein w is the helix angle of the helical flute relative to the twist drill axis at the point under consideration, and

$K$ is from 1.4 to 2.1.

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**5,035,553**

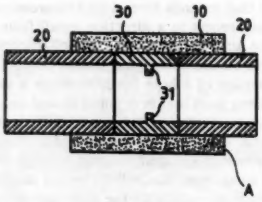
## DRILL BIT STORAGE RACK

**Han-Chi Lo, 4th Fl., Lane 60, Min-Sheng Rd., Taoyuan, Taiwan**

**Filed Jul. 3, 1990, Ser. No. 547,189**

**Int. Cl.[5] B65D *85/20***

**U.S. Cl. 408—241 R** **1 Claim**




1. A drill bit storage rack comprising:

(a) a housing having openings formed therein, said openings having differing diameters to accommodate drill bits of differing diameters;

(b) at least one outer cylindrical tube member adapted for insert into at least one of said housing openings in contiguous contact therewith, said outer cylindrical tube member having a predetermined interior diameter defining a through opening;

(c) a central interior cylindrical tube member having an external diameter substantially equal to said predetermined interior diameter of said outer cylindrical tube member, said central interior cylindrical tube member being rotatably displaceable with respect to said outer cylindrical tube member, said central interior cylindrical tube member including a through opening defining an interior wall having a pair of pin members extending inwardly with respect to said interior wall; and,

(d) a pair of opposing cylindrical tube members secured in fixed relation to said outer cylindrical tube member on opposing sides of said central interior cylindrical tube member for capturing said central interior cylindrical tube member therebetween, whereby a drill bit having helical grooves may be inserted within said outer cylindrical tube, said pin members being insertable within said helical grooves for guiding said drill bit to a predetermined position within said outer cylindrical tube responsive to a rotational displacement of said central interior cylindrical tube member.

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**5,035,554**

## METHOD FOR DETERMINING THE RADIUS DESCRIBED BY A TOOL

**Francis M. J. Nickols, 22 Gloucester Street, Wotton-Under-Edge, Gloucestershire GL12 7DN, England**

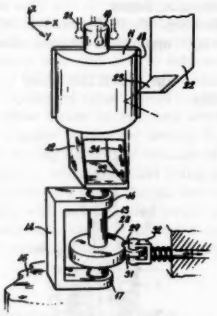
**PCT No. PCT/GB88/00610, § 371 Date Jan. 19, 1990, § 102(e) Date Jan. 19, 1990, PCT Pub. No. WO89/01193, PCT Pub. Date Feb. 9, 1989**

**PCT Filed Jul. 25, 1988, Ser. No. 458,616**

**Claims priority, application United Kingdom, Jul. 25, 1987, 8717703; Sep. 22, 1987, 8722223; Mar. 11, 1988, 8805845; Mar. 11, 1988, 8805846**

**Int. Cl.[5] B23C *9/00*; B23B *35/00***

**U.S. Cl. 409—131** **17 Claims**



1. A method for use in obtaining an indication of the radius of a circle described by the tip of a tool when driven by a machine tool comprising

mounting a tool for rotation about an axis nominally coincident with the axis of the maximum curvature of an arcuate surface,

bringing the tip of the tool into contact with the arcuate surface at least in two successive positions 180° apart with respect to the centre of rotation of the tip while varying the distance between the said centre of rotation and either the tip or the centre of arc of the surface if necessary to allow contact in the two positions to occur if the centre of arc is not coincident with the said centre of rotation, and

obtaining an indication of any change in the said distance, to allow the radius described by the tool tip to be derived from the radius of the arcuate surface and the said change in the said distance.

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**5,035,555**

## DEVICE FOR SETTING WORKPIECE TO POSITION

**Hiroshi Ueda, Ikoma, Japan, assignor to Ueda Engineering Kabushiki Kaisha, Nara, Japan**

**Filed Aug. 14, 1990, Ser. No. 568,097**

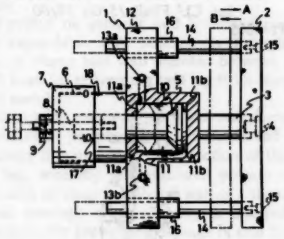
**Claims priority, application Japan, Sep. 14, 1989, 1-108140[U]**

**Int. Cl.[5] B23B *49/00*; B27B *27/10*; B23C *1/06***

**U.S. Cl. 409—218** **5 Claims**

1. A device for setting a workpiece to position comprising a rod securely fixed at one end to a workpiece backing plate and back and forth movably fitted in a support stand, a dial threadedly secured to a threaded portion formed on a rear peripheral

edge portion of said support stand, and a stopper provided at the rear end of said dial which is connected to said rod and which operates to regulate the movement of said workpiece



backing plate by abutting against the rear end face of the dial, whereby the movement of the workpiece backing plate can be set to a value proportional to the setting of the dial.

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**5,035,556**

## MACHINE FOR AUTOMATICALLY REGULATING AND MEASURING THE LENGTH OF EXTENSION AND THE DIAMETER OF A TOOL

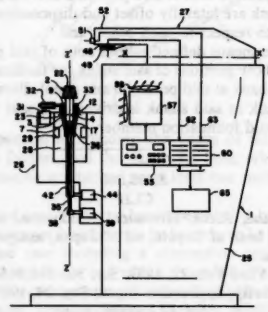
**Lionel Lamotte, Libération; Jean-Claude Mirey, Albert; Jean Omiel, Englebelmer, and Jean-Pierre Gaquere, Mailly Maillet, all of France, assignors to Aerospatiale Societe Nationale Industrielle, Paris, France**

**PCT No. PCT/FR87/00467, § 371 Date Jun. 7, 1989, § 102(e) Date Jun. 7, 1989, PCT Pub. No. WO89/04740, PCT Pub. Date Jun. 1, 1989**

**PCT Filed Nov. 24, 1987, Ser. No. 368,335**

**Int. Cl.[5] B23C *9/00*; B23B *49/00*; G06F *15/46*; B27G *23/00***

**U.S. Cl. 409—218** **17 Claims**



**1.** Machine for automatically adjusting and measuring the length of extension of a tool **2** mounted in a conical mandrel **3** capable of cooperating with a receiving cone **7** of said machine, said conical mandrel **3** being provided with an opening axial tap **5** adapted to receive said tool **2**, and comprising a means **9** for tightening said tool **2**, as well as a means **17** for adjusting said tool **2** housed in said axial tap **5**, said tool **2** coming into contact with said adjustment means **17**, said machine comprising a frame **25** and two carriages **26** and **27** movably mounted on said frame **25**, and capable of moving respectively parallel and transversely to the axis of said tool **2**, characterized in that the first of said carriages **26** comprises said receiving cone **7** receiving said conical mandrel **3** provided with said tool **2**, a first control means **31**, **32** acting on said tightening means **9**, and a second control means **35**, **39** acting on said adjustment means **17**, in that the second of said carriages **27** comprises a means **48** for detecting and measuring said tool **2** making it possible, when said tool **2** comes into contact with said detection and measuring means **48**, to measure the length of extension of said tool **2** with respect to said mandrel **3**, means **48** for detecting and measuring said tool **2** being disposed on said second carriage **27**, being constituted of a measuring sensor **48** against which the front face **22** of said tool **2** is capable of being applied a retractable sensor cover **49** being mounted on said measuring sensor **48**, the placing of said tool **2** in contact against said detection and measuring means **48** being effected by said adjustment means **17**, and in that said machine comprises

a programmer **57** in which are programmed the operations of adjustment and measurement carried out in accordance with an automatic cycle established previously,

a control keyboard **55** for the introduction of specific data in said programmer **57**, and

a display means **60** receiving a signal **63** from said detection and measuring means **48**, corresponding to a magnitude representative of the length of extension of said tool **2**, and indicating said extension length.

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**5,035,557**

## CHUCK FOR AXIALLY CLAMPING A TOOL TO A MACHINE TOOL SPINDLE

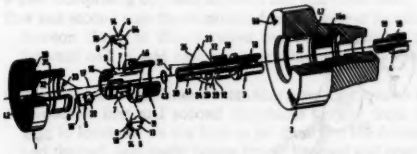
**Johann Kohlbauer, Ebermannstadt, and Horst Jäger, Nürnberg, both of Fed. Rep. of Germany, assignors to Hertel AG Werkzeuge & Hartstoffe, Fürth, Fed. Rep. of Germany**

**Filed Apr. 4, 1990, Ser. No. 504,313**

**Claims priority, application Fed. Rep. of Germany, Apr. 5, 1989, 3910965; Nov. 28, 1989, 3939227**

**Int. Cl.[5] B23C *5/26*; B23B *31/02***

**U.S. Cl. 409—233** **20 Claims**



**1.** A rotary chuck for axially clamping a tool, comprising

(a) a central longitudinal axis;

(b) a spindle terminus forming part of a rotary machine tool spindle; said spindle terminus having

(1) a frontal end face;

(2) means defining a throughgoing bore terminating in said frontal end face;

(c) clamping element holding means immobilized in the bore;

(d) a plurality of clamping elements circumferentially evenly distributed about said clamping element holding means; each clamping element being formed as a one-armed spreading lever having a first end pivotally supported in said clamping element holding means to provide for a pivotal movement of each said clamping element in a plane containing said axis; each clamping element having a second end provided with first and second engagement faces; said second end being spaced from said first end in a direction oriented away from said frontal end face; each clamping element having a radially outwardly swung clamping position in which each respective said first engagement face is adapted to be clamped against an inner shoulder of a hollow tool shank received in said bore for axially pulling the tool into engagement with said frontal end face of said spindle terminus; each said clamping element having a radially inwardly swung releasing position in which the tool is released from the chuck; and

(e) clamping drive means extending coaxially with said axis and having a clamping slope cooperating with a respective said second engagement face of said clamping elements; said clamping drive means being axially movable in

a first direction for displacing said clamping elements, by camming action between the clamping slope and the second engagement faces, into said clamping position; said clamping drive means being movable in a second direction for displacing said clamping elements into said releasing position; said clamping slope of said clamping drive means having a clamping slope portion being in engagement with said second engagement faces in said clamping position; said clamping slope portion being oriented to said central axis at such an angle as to self-lock the spreading levers in the clamping position.

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**5,035,558**

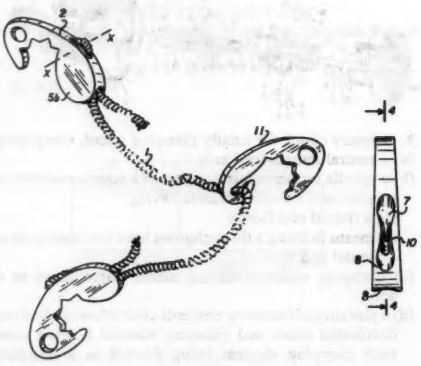
**CARGO TIE-DOWN DEVICE**

**Gildo G. Prosen, 7071 Belden St., San Diego, Calif. 92111**

**Continuation-in-part of Ser. No. 512,353, Apr. 30, 1990, abandoned. This application Dec. 17, 1990, Ser. No. 628,363**

**Int. Cl.[5] F16G *11/00***

**U.S. Cl. 410—96** **7 Claims**



1. In combination with a cargo tie-down assembly, a hook which comprises:

a generally shallow, oval slab having substantially flat top and bottom surfaces, and comprising a bail and a shank respectively defined at opposite longitudinal ends of the slab by a lateral cut-out section;

said slab having first and second linear tubular passages bored through the shank, said passages having axes parallel to each other and to said top and bottom surfaces, and being separated by a thin partition; and

said partition having a notch with lateral walls arcuately tapering down from a lateral edge of the slab toward the middle of the partition in a direction parallel to said axes whereby a rope inserted through said first passages is received around said notch and is then inserted through said second passages, and whereby said lateral walls of said notch are adapted to receive ropes of various diameters.

**5,035,559**

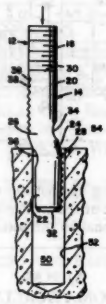
**ANCHORING DEVICE**

**Martin J. Nilsen, Hampshire, Ill., assignor to Illinois Tool Works, Inc., Glenview, Ill.**

**Filed Jan. 2, 1990, Ser. No. 459,491**

**Int. Cl.[5] F16B *15/06, 19/00***

**U.S. Cl. 411—508** **16 Claims**



1. An anchoring device, comprising:

a head for mounting an external element;

a shank integral with said head and adapted to be forcibly driven into a hole defined within a foundation member to which said external element is to be secured by means of said anchoring device;

said shank comprising a first substantially linear proximal portion adjacent to said head, a second substantially linear distal portion axially spaced from said proximal portion, and a transitional portion interposed between said interconnecting said proximal and distal portions by means of a proximal elbow portion and a distal elbow portion such that respective axes of said proximal and distal portions of said shank are laterally offset and dispossubstantially parallel with respect to each other; and

indentation means defined within both of said proximal and distal elbow portions of said shank for facilitating bending of said shank at said proximal and distal elbow portions of said shank as said shank is driven into said hole defined within said foundation member.

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**5,035,560**

**CLIP**

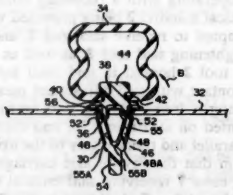
**Koji Watanabe, Aichi; Hiromichi Nakayama, and Kunihiro Fukuhara, both of Toyota, all of Japan, assignors to Nifco, Inc., Japan**

**Filed Feb. 27, 1989, Ser. No. 315,945**

**Claims priority, application Japan, Sep. 24, 1987, 62-145702**

**Int. Cl.[5] F16B *19/00***

**U.S. Cl. 411—508** **2 Claims**



1. An attachment clip for attaching an ornamental member to a wall member, said attachment clip comprising:

a head to which said ornamental member is attached and which is positioned on one side of said wall member;

a leg projecting integrally from said head and penetrating

through said wall member, said leg having a pair of branched members extending from said head, said branched members being joined integrally at the distal ends thereof with the distal end portion of said leg, said end portion of said leg being directed ahead at the time of insertion;

a pawl provided on each of said branched members and radially expandable after penetration through said wall member to clamp said wall member between said pawls and said head for preventing said leg from slipping out of the wall member;

a thin-wall portion made of soft resin and formed around respective outer peripheries of said pawls and said leg to be relatively immovable in the direction of the extension of said leg, whereby said thin-wall portion comes into contact with an inner peripheral wall of a through hole in said wall member, when said leg is inserted into said through hole, for preventing damage of said through hole due to direct engagement of said leg against the inner peripheral wall of said through hole; and wherein the leg includes a raised member disposed between the thin-wall portion and the distal end of the leg.

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**5,035,561**

## APPARATUS FOR BINDING LEAVES WITH HEAT

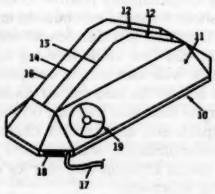
**Bernd Loibl, Konigsbrun, Fed. Rep. of Germany, assignor to Ibico Inter Binding G.m.b.H., Lottstetten, Fed. Rep. of Germany**

**Filed Jan. 24, 1990, Ser. No. 469,863**

**Claims priority, application Switzerland, Jan. 27, 1989, 279/89**

**Int. Cl.[5] B42B *5/00***

**U.S. Cl. 412—33** **15 Claims**



1. An apparatus for binding the edges of leaves, such as pages, small folders, and the like, with heat, wherein a heat-sensitive adhesive is attached to at least one such edge, comprising:

an elongated case having at least one opening into which the edges of leaves which are to be bound can be inserted, said elongated case including a connection cable having at least one conductor and which is capable of coupling to an electrical power source and is controllable by a switch;

an elongated heat-conducting member positioned in the elongated case under said opening and having a substantially planar top surface, said elongated heat-conducting member having a length which generally corresponds to the length of the edges to be bound and a width which conforms to the width of said opening in such a manner that the edges of the leaves can lie on the top surface, and said heat-conducting member including a pair of legs on the bottom surface and extending away to form a longitudinal slot therebetween;

at least one heating element which fits into said longitudinal slot and forms a heating assembly with said elongated heat-conducting member, wherein said heating element includes two heat and electricity-conducting fillets with a thin narrow strip of PTC resistance material positioned therebetween, each fillet being connected to one of the conductors of the connection cable; and

an insulating sheath positioned about the fillets to hold said fillets together, wherein said sheath is formed of a substantially electrically-insulating and thermally-conducting material.

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**5,035,562**

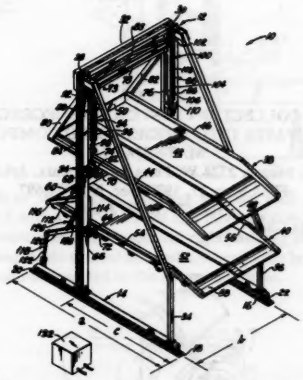
## TRI-LEVEL VEHICULAR PARKING APPARATUS

**Arnold M. Rosen, Bergenfield, N.J., assignor to Park Plus Corporation, Hauppauge, N.Y.**

**Filed Jan. 9, 1990, Ser. No. 462,571**

**Int. Cl.[5] B66F *1/04***

**U.S. Cl. 414—240** **22 Claims**



1. A tri-level vehicular parking apparatus comprising:

a base comprising opposed forward and rearward ends;

first and second stanchions mounted to said base at locations thereon closer to the rearward end thereof than to the forward end of said base and extending upwardly therefrom;

first and second angle braces extending from locations on the respective first and second stanchions remote from the base to locations on the base in proximity to the forward end thereof, said angle braces being disposed and configured to enable opening of a door of a vehicle parked adjacent said base;

first and second vehicular parking platforms disposed intermediate the stanchions, each said parking platform including a forward end extending forwardly of said stanchions and a rearward end extending rearwardly of said stanchions, said parking platforms being independently movable from positions generally adjacent the base where the first parking platform is nested over the second parking platform to positions spaced from the base;

first and second frame means connected to the respective first and second parking platforms and movably engaged with the stanchions for maintaining said first and second parking platforms in substantially horizontal respective alignments at locations intermediate the stanchions and spaced from the base each said frame means comprising a pair of vertical supports rigidly connected to the respective parking platform and movably engaged with an associated one of said stanchions, said first and second frame means each further comprising a pair of diagonal supports connected to the corresponding vertical support at locations thereon remote from the respective first and second parking platforms and extending to locations on the respective first and second parking platforms in proximity to the rearward ends thereof; and

first and second elevating means for selectively moving the respective first and second parking platforms and the respective first and second frame means alternately toward and away from said base, whereby said first parking platform can be moved selectively to intermediate and upper elevated positions spaced from said base, and

whereby said second parking platform can be moved to the intermediate position when the first parking platform is in the upper position such that a first vehicle can be parked on the first parking platform in the upper position, a second vehicle can be parked on the second parking platform in the intermediate position and a third vehicle can be parked beneath the second parking platform.

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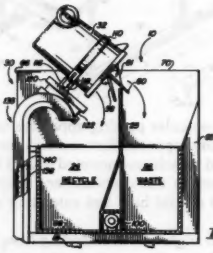
**5,035,563**

## WASTE COLLECTION SYSTEM FOR SEGREGATING SOLID WASTE INTO PRESELECTED COMPONENT MATERIALS

**Armand G. Mezey, 2724 W. Palm La., Phoenix, Ariz. 85009**

**Filed Mar. 17, 1989, Ser. No. 324,697**
**Int. Cl.[5] B65F *3/04***
**U.S. Cl. 414—409** **10 Claims**



1. An improved waste collection system of the type for collection waste from on-site locations along a route and transporting the collected waste to a centralized dumping station, said system comprising:

(a) at least one on-site waste storage container having a bottom and an upstanding wall defining an interior including divider means forming at least two waste-receiving compartments therein each for receiving predetermined different types of waste, said compartments each having an openable cover moveable between an open and a closed position;

(b) a mobile waste collection device having upstanding side walls, said collection device having at least a partially open top defining a waste-receiving hopper for receiving waste emptied into said collection device, said collection device having divider means associated therewith separating the waste collection device into separate chambers each for temporary storage and transportation of predetermined different types of waste;

(c) loader means associated with said collection vehicle having container pick-up means for releasably holding said container and lift means for elevating said container from a lowered on-site location to a dump position in which the container is at least partially inverted over said hopper area; and

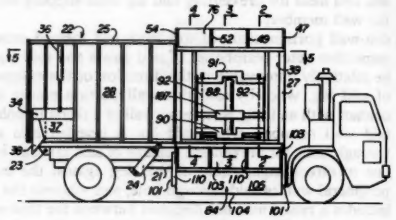
(d) said container in said dump position being positioned relative to said chambers to move said covers to an open position each adjacent a separate chamber to substantially cause the contents of the container compartments to be emptied into separate chambers of the waste collection device thereby segregating the waste into preselected types of waste in the collection operation.

**5,035,564**

## TRUCK BODY CONSTRUCTION FOR SEPARATE HANDLING OF RE-CYCLABLE REFUSE

**Tom T. Matsumoto, c/o Sunnyvale Truck Equipment Co. 755 N. Mathilda Dr., Sunnyvale, Calif. 94086**

**Filed Aug. 8, 1989, Ser. No. 390,774**
**Int. Cl.[5] B65B *21/02***
**U.S. Cl. 414—409** **27 Claims**



1. A truck for separate handling or segregated refuse comprising

a body having a bottom, a first side, a second side opposite said first side, a front, a rear, and a top,

at least one vertical, longitudinal partition running through said body from said front toward said rear dividing said body into first and second longitudinal compartments spaced laterally relative to each other,

said top having a first and a second opening, said openings being spaced longitudinally relative to each other,

first and second chute-forming means for said first and second openings, respectively, said chute-forming means being spaced longitudinally relative to each other,

a first chute bottom for said first chute-forming means slanting laterally from said first side downwardly into said first compartment, said first chute-forming means having no communication with said second compartment,

a second chute bottom for said second chute-forming means slanting laterally from said first side downwardly into said second compartment, said second chute-formitg means having no communication with said first compartment,

and discharge means adjacent said rear for discharging said compartments separately.

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**5,035,565**

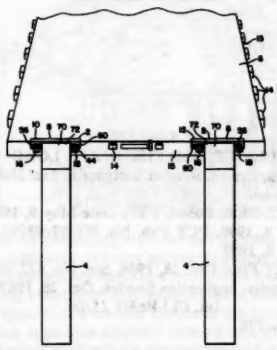
## HINGE BAR CONNECTOR ASSEMBLY TO CONNECT RAMPS TO A FLAT BED TRAILER

**Paul White, 135 Oak Ave., Lockport, Ill.**

**Filed Jan. 22, 1990, Ser. No. 468,293**
**Int. Cl.[5] B65G *69/28***
**U.S. Cl. 414—537** **5 Claims**

1. A ramp coupling assembly to couple a ramp to a short side edge portion of the bed of a cargo vehicle, comprising an elongated cross piece support member shorter than any side edge of said bed of said cargo vehicle detachable therefrom and detachable thereto, insert means extending from said support member laterally thereof and at a substantially right angle thereto to be received in socket means secured to said cargo vehicle, including said socket means secured to said cargo vehicle, ramp connecting means to connect said ramp to said support member, said laterally extending insert means and said ramp connecting means being spaced apart, and a receiving space between said insert means and said ramp connecting means to receive a portion of said socket means therein and to thereby enable said elongated cross piece support member to be more securely held by in turn enabling its insert means to be inserted farther into said socket means as said portion thereof is received into said receiving space between said insert means and said ramp connecting means, wherein said laterally extending insert means includes a first insert leg extending laterally from said support member at substantially a right angle thereto

in one direction and terminating at a free end, a second insert leg extending laterally from said support member at substantially a right angle thereto in said one direction and terminating at a free end, said second insert leg being spaced apart from said first insert leg a pre-selected distance, said socket means including a first socket member having a cavity to receive said first insert leg, a second socket member having a cavity to receive said second insert leg, said second socket member being spaced apart from said first socket member said pre-selected distance, each of said cavities of said first and second socket members opening to a first peripheral edge of respective ones of said socket members bordering the respective entrances thereto, said free ends of said insert legs being insertable far enough for said support member to contact and rest



against said first peripheral edge of each of said first and second socket members, wherein said support member comprises a cross piece having an inserted L-shaped cross-sectional configuration, including a first laterally elongated plate and a second laterally elongated plate integrally joined thereto extending at substantially a right angle therefrom, said first laterally elongated plate having an inner surface facing in one direction, said second laterally elongated plate having an inner surface facing in a direction which intersects said one direction and an outer surface facing in the opposite direction, said insert legs extending from said inner surface of said first laterally elongated plate and being spaced apart from said inner surface of said second laterally elongate plate to provide said receiving space between said insert legs and said inner surface of said second laterally elongated plate.

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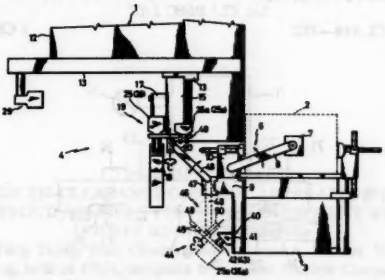
**5,035,566**

## AUTOMATIC CHANGE OF FINGERS OF THE SINGLE ARM BENDING ROBOT

**Franco Sartorio, and Stefano Vergano, both of Turin, Italy, assignors to Amada Company, Limited, Japan**

**Filed Dec. 14, 1988, Ser. No. 284,387**
**Claims priority, application Italy, Dec. 15, 1987, 68075 A87**
**Int. Cl.[5] B25J *15/04***
**U.S. Cl. 414—729** **10 Claims**

1. A manipulator for a plate bending machine comprising:
an arm which extends substantially in the vertical direction;
a pair of bracket members mounted on the arm in a manner such that one bracket member can freely approach and withdraw from the other;
a pair of jaws for grasping a plate material; and
means for removably mounting one of said jaws on each of said bracket members, the removable mounting means including a pair of engaging members provided on each of the bracket members, and a pair of engaging sections formed in each of the jaws, each engaging member cooperating with one of the engaging sections, each of the engaging members further including an engaging pin supported on one of the bracket members in a freely protruding and retracting manner in a sidewall thereof and means for biasing the engaging pin so as to protrude from the sidewall of the bracket member, and each of the engaging sections including an engaging hole for receiving one of the engaging pins protruded from one of the side-



walls of the bracket members wherein each jaw is provided with a pair of forked legs having a concave section therebetween to form left and right hand leg sections each having inside and outside walls, wherein the bracket member can be inserted in the concave section.

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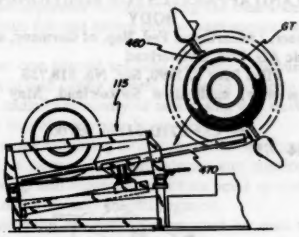
**5,035,567**

## UNLOADER FOR TIRE BUILDING SYSTEM

**Paul J. Davis, Findlay, Ohio, assignor to Cooper Tire & Rubber Company, Findlay, Ohio**

**Filed May 25, 1990, Ser. No. 529,073**
**Int. Cl.[5] B65G *47/00***
**U.S. Cl. 414—751** **5 Claims**



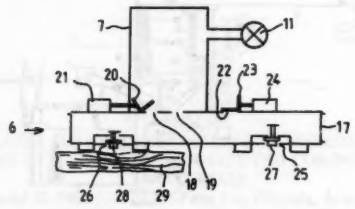

1. A mechanism for unloading an assembled green tire from a tire building drum, comprising
a pair of extensible transfer arms mounted extending in parallel spaced relation on opposite side of the rotational axis of the building drum and each having free ends projecting into radial spacing from the drum,
means for moving said arms in synchronism from a rest position away from the drum to a pick-up position outward of a green tire on the drum and then to an unload position beyond the drum,
a movable grip carried at each free end of each arm,
means for extending said grips along generally opposed paths in an inward direction from said ends of said arms into engagement with the periphery of a green tire located on the drum,
unloading track means located at the unload position of said arms and receiving green tires released from said grips at the unload position.

5,035,568

## SUCTION GRIPPER DEVICE AND OBJECT TRANSFER DEVICE

Michel Joulin, Morigny, France, assignor to Joulin Aero Distribution S.A.R.L., Etampes, France

Filed Dec. 19, 1989, Ser. No. 452,648
Claims priority, application Sweden, Dec. 19, 1988, 8804571
Int. Cl.[5] B66C 1/02
U.S. Cl. 414—752 1 Claim




1. In a suction gripper device for gripping substantially flat objects comprising a suction plate (17) having an underside surface with suction openings therein closable by calibrated flaps, said suction plate being connected through a closable opening with a vacuum vessel (16) connected with a vacuum pump (11), the improvement wherein the vacuum vessel (16) is connected with the suction plate (17) by means providing a controlled leakage for maintaining normal operation vacuum within the vacuum vessel (16) at a pre-defined maximum value, wherein the suction plate (17) and the vacuum vessel (16) are separated by a common wall including a first vacuum opening (18), a second atmosphere connection opening of a closable type and a calibrated opening (19) for controlled leakage, said calibrated opening (19) comprising said controlled leakage means, and wherein said vacuum vessel (16) is a supporting hollow column (7) of the suction plate (17) connecting said suction plate (17) to said vacuum pump (11).

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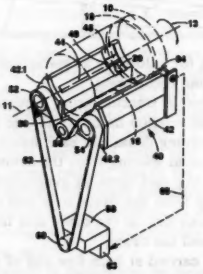
5,035,569

## METHOD AND APPARATUS FOR POSITIONING A CAN BODY

Kurt Alzmauer, Lauchringen, Fed. Rep. of Germany, assignor to Elpatronic AG, Zug, Switzerland

Filed May 2, 1990, Ser. No. 518,733
Claims priority, application Switzerland, May 16, 1989, 01814/89
Int. Cl.[5] B21D 51/26, 43/00
U.S. Cl. 414—757 20 Claims



5. An apparatus for positioning a can body which body consists of a longitudinal seam welded cylinder provided with a tongue-like projection at a predetermined point of its outer circumference and is to be further processed, characterized by a body-receiving device in the form of a block having an opening in which the can body is received in a spatially fixed manner for rotational movement, the block having an arcuate groove in the region of the path followed by the tongue-like projection during rotational movement of the can body within the block; means supporting the can body in the opening of the block for rotational movement about its longitudinal axis; driving means for rotating the can body within the block about the longitudinal can axis and a stop or like sensor or obstacle in the arcuate groove of the block and rotational path of the tongue-like projection to stop the rotational movement of the can body at a predetermined rotational position.

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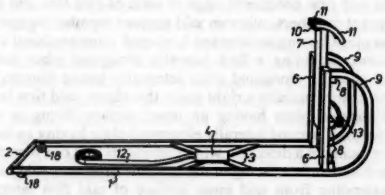
5,035,570

## DEVICE FOR TURNING A LOAD

Nils Petersson, BraÅs, Sweden, assignor to Leif Hultberg, Lenhovda, Sweden

PCT No. PCT/SE88/00564, § 371 Date May 9, 1990, § 102(e) Date May 9, 1990, PCT Pub. No. WO89/03799, PCT Pub. Date May 5, 1989
PCT Filed Oct. 25, 1988, Ser. No. 473,988
Claims priority, application Sweden, Oct. 26, 1987, 8704149-7
Int. Cl.[5] B65H 15/00
U.S. Cl. 414—778 1 Claim




1. A device for turning upside-down a load (5) which is positioned on a support (15) so as to be spaced from an underlying surface (17), such as for turning a pile of papers in conjunction with a printing press, comprising a load supporting member (1, 4) for carrying the load (5); a side support (6, 7) adapted to engage one side of said load (5) and including a member (6) fixedly connected with said load supporting member (1, 4), and a member (7) which is movable relative to the fixed member so as to adjust the height of said side support to the height of said load (5), and which is provided with a flange (10) for engaging the upper side of said load (5); lever means (1, 2) for manipulating said device, said lever means being connected with said load supporting member (1, 4) and adapted to be moved, together with the load supporting member, under the load (5) to a starting position in which said load supporting member (1, 4) is located under the load (5), said side support (6, 7) engages said one side of the load, and said lever means (1, 2) extends beyond the load at the opposite side thereof; clamping means (12, 13) for clamping the load (5) against the load supporting member (1, 4) and the side support (6, 7); and arcuate support means (9, 11) arranged on said side support and adapted to rest against said underlying surface (17) and about which said device is turnable upon raising of the lever means (1, 2) from said starting position and continued turning thereof for turning the load (5) upside-down, an arcuate support element (11) of said arcuate support means being carried by said movable member (7) of said side support.

5,035,571

## ASSEMBLY FOR PALLETIZING CROSS-WOUND BOBBINS

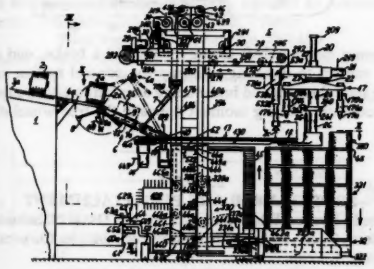
Hans Raasch, Monchen-Gladbach, Fed. Rep. of Germany, assignor to W. Schlafhorst AG & Co., Mönchengladbach, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 186,375, Apr. 26, 1988, abandoned. This application May 8, 1989, Ser. No. 348,987

Claims priority, application Fed. Rep. of Germany, Apr. 28, 1987, 3714057

Int. Cl.[5] B65G *57/20*

U.S. Cl. 414—789.5 10 Claims



1. Assembly for palletizing cross-wound bobbins on a pallet, comprising a stationary delivery apparatus having a discharge location, and a palletizing apparatus including a frame, a transport belt having a supporter and being disposed downstream of the delivery apparatus, a transfer device in the form of a gripping and lifting apparatus disposed downstream of said transport belt, a swivel joint rigidly connecting said supporter to said gripping and lifting apparatus, and a rotary slide joint pivotably and longitudinally slidably connecting said supporter to said frame relative to the delivery apparatus for maintaining said transport belt below the discharge location regardless of the location of said gripping and lifting apparatus, said gripping and lifting apparatus having at least two grippers being pivotable about a vertical axis, means for lifting and lowering said grippers, and means for simultaneously operating said grippers to move one of said grippers to a position for receiving a cross-wound bobbin from said transport belt while moving another of said grippers to a position for dropping-off a cross-wound bobbin onto a pallet.

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5,035,572

## ARRANGEMENT FOR ADJUSTING GUIDE BLADES

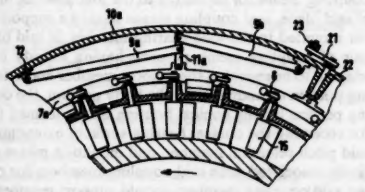
Joachim Popp, Dachau, Fed. Rep. of Germany, assignor to MTU Motoren-und Turbinen-Union Munchen GmbH, Fed. Rep. of Germany

Filed Apr. 12, 1990, Ser. No. 508,173

Claims priority, application Fed. Rep. of Germany, Apr. 21, 1989, 3913102

Int. Cl.[5] F01D *9/00, 17/00*

U.S. Cl. 415—12 28 Claims



1. An arrangement for adjusting guide blades in a turbo-engine by means of the thermal expansion of an expansion rod acted upon by working gas which, at one end, is stationarily mounted at a supporting housing and, with its other end, is linked to a step-up device, wherein the expansion rod has a significantly different coefficient of linear expansion with respect to a supporting housing, and wherein the step-up device includes step-up lever means connected with a guide-blade-coupled adjusting ring.

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5,035,573

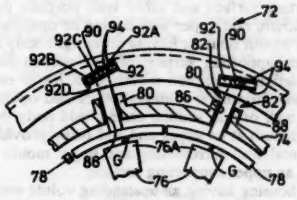
## BLADE TIP CLEARANCE CONTROL APPARATUS WITH SHROUD SEGMENT POSITION ADJUSTMENT BY UNISON RING MOVEMENT

Wu-Yang Tseng, West Chester, and Ambrose A. Hauser, Wyoming, both of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Mar. 21, 1990, Ser. No. 507,428

Int. Cl.[5] F01D *11/08*

U.S. Cl. 415—173.2 12 Claims



1. In a gas turbine engine including a rotatable rotor having a central axis and a row of blades with outer tips and a stationary casing with a shroud disposed in concentric relation with said rotor, an apparatus for controlling the clearance between said rotor blade tips and casing shroud, said apparatus comprising:

(a) at least one shroud segment defining a circumferential portion of said casing shroud and being separate from and spaced radially inwardly of said casing and outwardly of at least one of said rotor blade tips;

(b) at least one mounting structure on said stationary casing defining a passage between exterior and interior sides of said casing, said mounting structure being spaced radially outwardly from said shroud segment;

(c) a positioning mechanism supported by said mounting structure, connected to said shroud segment, and being movable toward and away from said rotor blade tip; and

(d) an actuating mechanism coupled to said positioning mechanism and being operable to move circumferentially relative to said rotor axis between first and second angularly displaced limit positions to cause nonrotatable, linear movement of said positioning mechanism and said shroud segment connected therewith radially relative to said rotor axis to a position between inner and outer positions which define maximum and minimum clearance between said shroud segment and said rotor blade tip;

said actuating mechanism being in the form of an annular member having at least one slot defined therethrough extending in a transverse inclined relation to the respective directions of movement of said actuating and positioning mechanisms and having spaced opposite ends defining said first and second angularly displaced limit positions of said annular member at said slot therethrough.

5,035,574

## PUMP HOUSING, MOULD PARTS OF A MOULD WALL FOR A PUMP HOUSING AND METHOD OF MANUFACTURING A PUMP HOUSING

Gerrit de Vries, Hengelo, Netherlands, assignor to Stork Pompen BV, Hengelo, Netherlands

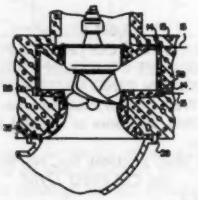
Division of Ser. No. 518,676, Jul. 29, 1983, Pat. No. 4,869,643. This application Aug. 16, 1989, Ser. No. 394,478

Claims priority, application Netherlands, Aug. 12, 1982, 8203179

The portion of the term of this patent subsequent to Sep. 26, 2006, has been disclaimed.

Int. Cl.[5] F04D 29/40

U.S. Cl. 415—200 16 Claims



1. A pump installation comprising the combination of:

a suction casing having a horizontal upper wall defining a supporting surface and other wall portions defining an inlet mouth, said upper wall having an opening therein;

a suction mouth housing having an upright body supported on said supporting surface of said suction casing, said body defining a suction mouth at its lower end aligned with and forming a continuation of said opening in the upper wall of said suction casing, said body defining an upper mouth at its upper end and being provided with a horizontal wall surrounding said upper mouth and presenting an upper supporting surface;

a volute housing having an upstanding volute wall defining a horizontally facing discharge mouth, the lower edge of said volute housing being supported on said supporting surface of the suction mouth housing, and said volute housing having a horizontal wall joined to the upper edge of said volute wall and defining, in conjunction with said volute wall and said supporting surface of the suction mouth housing, a volute chamber adapted to receive a pump impeller;

at least the volute housing being a thin-walled, prefabricated structure made of reinforced concrete; and

a concrete substructure completely surrounding, in contact with and wholly embedding said volute housing, the underlying suction mouth housing supporting it and the underlying suction casing upon which the suction mouth housing is supported.

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5,035,575

## YAWING SYSTEM FOR A WIND MILL

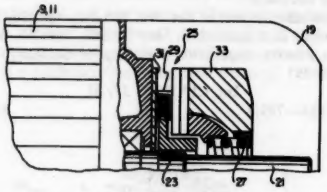
Erik Nielsen, Odense, and Erland F. Hansen, Morke, both of Denmark, assignors to I.K. Trading Aps., Odense SV, Denmark

Continuation-in-part of Ser. No. 150,770, Feb. 1, 1988, Pat. No. 4,966,525. This application Sep. 12, 1989, Ser. No. 406,101

Int. Cl.[5] F03D 7/04

U.S. Cl. 416—9 4 Claims

1. A yawing system for a wind turbine, the operation of said turbine being dependent on the wind direction, wherein the turbine is in a housing resting on a yawing bearing at the top of a tower, comprising at least two yawing motors for turning the housing relative to the tower about a substantially vertical axis via a gear assembly co-operating with a toothed rim of the yawing bearing, said motor responding to a control system, said at least two yawing motors each having a non-locking gear assembly co-operating with the yawing bearing for turning said housing, the control system in a passive state with the wind turbine at a desired position, controlling said motors to give substantially equal and, relative to the housing, mutually opposite torques, in one of each motor and in the connecting point between each motor and toothed rim a free wheel device



between a driving shaft of the motor and a brake, said shaft being subject to disengagement by the control system in the active state thereof, said brake being adapted to give a substantially constant braking moment opposite the free wheel direction.

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5,035,576

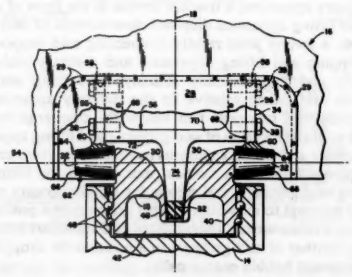
## PROPELLER BLADE PIN ATTACHMENT

Francis E. Byrnes, White Plains, N.Y., and David N. Schmaling, Oxford, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Oct. 11, 1989, Ser. No. 419,863

Int. Cl.[5] B64C 11/00, 27/00

U.S. Cl. 416—134.00 R 4 Claims



1. Apparatus for mounting a propeller blade having a load bearing member to a hub, said apparatus comprising:

a. a pitch retention member rotatably mounted to said hub so as to extend axially outwardly therefrom, said retention member having a cylindrical body portion having a first relatively closed end mounted to said hub, a second open end extending outwardly from said hub, and a receiving nipple extending centrally from the relatively closed end axially outwardly toward and opening to the open end, and having a pair of conical bearing surfaces extending therefrom in opposite directions along an axis outboard of said hub and parallel to a chord of said blade;

b. coupling means for mounting to the load bearing member of said blade, said coupling means having a support member mounted to the load bearing member of said blade, a pair of coupling members, each having a body portion adapted to be mounted the support member and a depending portion extending from the body portion, the depending portion having conical housing means formed therein for receiving the conical bearing surfaces extending from said pitch retention member, and mounting means operatively associated with said coupling members for mounting said coupling members to said support member;

c. annular conical elastomeric bearing means disposed within said housing means between the housing means and the bearing surface received therein, said elastomeric

bearing means reacting dynamic forces of said blade as said blade rotates about the bearing surface and reacting motion of said blade parallel to said axis or in tilt relative to said axis in compression; and

d. an elongated rigid member mounted to the load bearing member of said blade and extending radially inwardly therefrom through the open end of said pitch retention member to be loosely received within the receiving nipple of said pitch retention member.

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**5,035,577**

## BLADE FOR AN AIRCRAFT ROTOR AND ROTOR COMPRISING SUCH A BLADE

**Alain Damongeot, Ventabren, France, assignor to Aerospatiale Societe Nationale Industrielle, Paris, France**

**Filed Sep. 19, 1989, Ser. No. 409,429**
**Claims priority, application France, Sep. 19, 1988, 88 12188**
**Int. Cl.[5] B64C *11/18***
**U.S. Cl. 416—223 R** **7 Claims**

1. Blade for an aircraft rotor whose successive elementary sections along at least the larger part of the wingspan R present a constant chord Co and said elementary sections are twisted from the root of said blade towards the extremity of the latter by an angle $\theta$ whose variation $d\theta/dr$ according to the wingspan position r of a given elementary section is constant, wherein said blade exhibits in the end zone extending at least between 0.85 R and at least 0.95 R an excess twist so that the resultant twist in said zone is less than or at the most equal as an absolute value to the limiting twist given by:

$$\theta lim = \theta + 1(Czlim - Cz), \quad (1)$$

an equation in which k is the ratio of k the variation of the lift coefficient Cz to the variation of incidence i and Czlim is an upper limiting value for the lift coefficient Cz so that, firstly, in a first fraction of the end zone extending at least between r=0.85 R and approximatively r=0.9 R, the limiting lift coefficient has a value

$$Czlim1 = Czm - a(r/R - b), \quad (2)$$

an equation in which Czm is the mean lift coefficient of said rotor, a and b are constants at least equal to 1.6 and 0.87 respectively and being such that secondly, in a fraction of the end zone extending between approximately r=0.9 R and at least r=0.95 R, the limiting lift coefficient Czlim2 has a value linearly decreasing from the value of Czlim1 given by the equation (2) for r=0.9 R to the zero value for r=R.

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**5,035,578**

## BLADING FOR REACTION TURBINE BLADE ROW

**Mank H. Tran, Orlando, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Oct. 16, 1989, Ser. No. 422,333**
**Int. Cl.[5] F01D *5/14, 5/22***
**U.S. Cl. 416—223 A** **9 Claims**

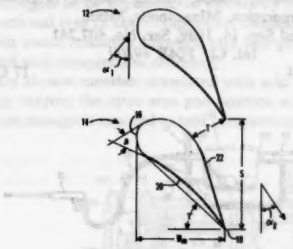
1. A blade for a steam turbine comprising:

a leading edge;

a trailing edge;

a concave, pressure-side surface extending between the leading and trailing edges, and having a radius of curvature; and

a convex, suction-side surface extending between the leading and trailing edges, and having a radius of curvature, said leading edge, trailing edges, convex and concave surfaces forming an airfoil,



wherein the radius of curvature along the convex, suction-side surface continuously increases from the leading edge to the trailing edge; and

wherein blade orientation is about 46°±3°.

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**5,035,579**

## WATER-TURBINE RUNNER AND PROCESS FOR MANUFACTURING THE SAME

**Masami Yada; Takao Funamoto; Michio Kitamura; Junzo Komatsu; Masakazu Midorikawa, and Tsugio Yoshikawa, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Nov. 15, 1989, Ser. No. 436,701**
**Claims priority, application Japan, Nov. 22, 1988, 63-295147**
**Int. Cl.[5] B63H *1/00***
**U.S. Cl. 416—241 R** **14 Claims**

1. A water-turbine runner comprising a rotary member with a central portion for connecting a drive shaft, and a plurality of vanes each provided on said rotary member, each of said vanes is made of a rolled steel plate comprising, by weight, 0.01 to 0.10% of C, 0.10 to 1.0% of Si, 0.10 to 2% of Mn, 4 to 6% of Ni, 10 to 15% of Cr and 0.10 to 3% of Mo, and 71.9 to 87.7% of Fe, and has a metallic mixture containing, by volume, martensite and 10 to 35% of residual austenite, and wherein weld means are provided for mounting said vanes on said rotary member.

13. A process for manufacturing a water-turbine runner, comprising the steps of:

forming into a three-dimensional shape a rolled steel plate which contains, by weight, 0.01 to 0.10% of C, 0.10 to 1.0% of Si, 0.10 to 2% of Mn, 4 to 6% of Ni, 10 to 15% of Cr and 0.10 to 3% of Mo, 71.9 to 87.7% of Fe, the oxygen content being no greater than 60 ppm, and the nitrogen being no greater than 150 ppm, and which has a metallic structure mixture containing martensite and residual austenite and which is regulated such that the residual austenite is 10 to 35% by volume;

electron beam welding the formed steel plate; and

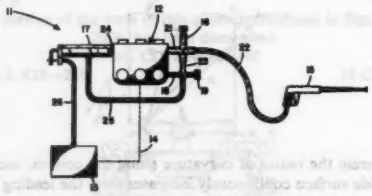
subjecting the steel plate to a heat treatment so that welded portions contain 10 to 35% of residual austenite by volume.

**5,035,580**

## BYPASS MODE CONTROL FOR HIGH PRESSURE WASHING SYSTEM

**Dallas W. Simonette, Blaine, Minn., assignor to Diversified Dynamics Corporation, Minneapolis, Minn.**

**Filed Sep. 14, 1989, Ser. No. 407,241**
**Int. Cl.[5] F04B *49/00***
**U.S. Cl. 417—34** **17 Claims**



1. Control apparatus for producing mechanical motion in response to increasing fluid pressure after a predetermined minimum pressure has been reached, comprising:

a body defining an internal chamber, a fluid inlet leading into the chamber and a fluid outlet leading from the chamber;

piston means disposed in the chamber and movable in response to fluid pressure between first and second positions, said piston means defining fluid passage means disposed between said fluid inlet and said fluid outlet;

actuator means carried by the piston means for producing usable mechanical motion as a function of movement of said piston means;

and pressure actuated, normally open valve means disposed in said passage means for establishing fluid flow between said inlet and outlet in its open mode, and movable to a closed position when pressure at said inlet reaches a predetermined level to block fluid flow between the inlet and outlet, the valve means comprising a ball member, an annular seat member disposed in the passage means and forming part thereof, and spring means for urging the ball away from the seat member;

the piston means and valve means being together constructed and arranged so that, when the valve means closes and fluid flow is blocked, the piston means is movable from the first to the second position by fluid pressure at said inlet, whereby the actuator means is moved.

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**5,035,581**

## FLUID LEVEL MONITORING AND CONTROL SYSTEM

**Danny G. McGuire, 1205 W. Beech, Duncan, Okla. 73533; Damon C. McGuire, 201 Horizon Dr., Apt. No. 1, Altus, Okla. 73521; Denver C. McGuire, P.O. Box 1126, Roland, Okla. 74954, and Mark E. Sudberry, 2020 Gatlin, Duncan, Okla. 73533**

**Filed Nov. 17, 1989, Ser. No. 438,583**
**Int. Cl.[5] F04B *49/02, 49/04***
**U.S. Cl. 417—36** **23 Claims**

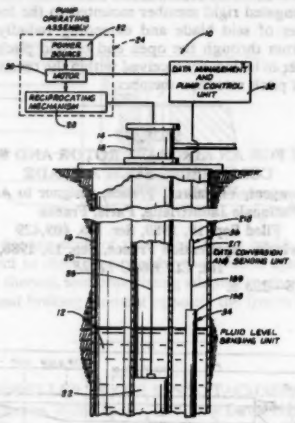
1. A system for monitoring and controlling the level of fluid in a vessel, comprising:

a plurality of sensors supported at selected levels in the vessel, wherein each such sensor is capable of inputting an electrical signal and, in response thereto, outputting a first electrical signal if the sensor is submerged in fluid and a second electrical signal if the sensor is not submerged, and wherein the input and output of each sensor is independent of each other sensor;

means for transmitting an electrical signal to each of the sensors;

means for converting the electrical signals output by the sensors into digital signals;

means for receiving the digital signals from the electrical signal converter means and converting the digital signals to a humanly perceivable form; and




means responsive to the digital signals for adjusting the fluid level in the vessel to a preselected fluid level.

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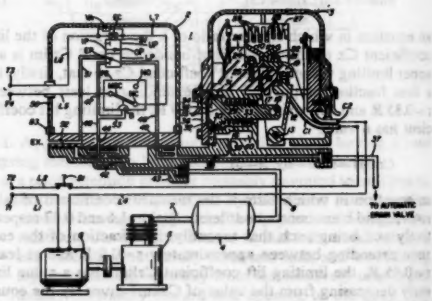
**5,035,582**

## ELECTRO-PNEUMATIC GOVERNOR FOR A COMPRESSED AIR-SYSTEM

**John B. Carroll, Irwin, Pa., and Michael V. Hatzikazakis, Greer, S.C., assignors to American Standard Inc., Spartanburg, S.C.**

**Filed Jan. 22, 1990, Ser. No. 468,454**
**Int. Cl.[5] F04B *49/06***
**U.S. Cl. 417—44** **22 Claims**



1. An electro-pneumatic governor for a compressed air system comprising, an electric motor for driving an air compressor to cause pressure build-up in a storage reservoir, a pressure switch for sensing the pressure level in said storage reservoir, a solenoid valve electrically connected to said pressure switch, a pneumatically operated switch contact controller electrically connected to said electric motor, said pressure switch causing said solenoid valve to establish communication between said storage reservoir and said pneumatic operated switch contact controller when the pressure level in said storage reservoir reaches a first predetermined value so that said pneumatic operated switch contact controller deenergizes said electric motor, and said pressure switch causes said solenoid valve to interrupt the communication between said storage reservoir and said pneumatically operated switch contact controller when the pressure level falls below a second predetermined level so that said pneumatically operated switch contact

controller reenergizes said electric motor when the pressure level in said storage reservoir drops to a second predetermined value.

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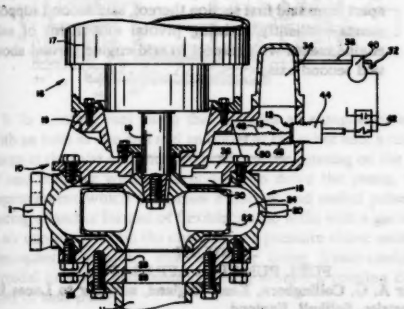
5,035,583

## SEWAGE PUMP PRIMING SYSTEM

Reid W. Vaught, Kansas City, Mo., assignor to Smith & Loveless, Inc., Lenexa, Kans.

Filed Mar. 21, 1990, Ser. No. 496,884
Int. Cl.[5] F04D 9/04
U.S. Cl. 417—200 3 Claims



1. In a vertical shaft centrifugal pump for pumping sewage including a housing defining a pumping chamber having an impeller rotatably mounted therein, said pumping chamber having a generally annular side wall with a discharge nozzle in one quadrant of its circumference and a bottom wall defining an inlet port, the improvement in a vacuum priming system for drawing liquid into said pumping chamber to prime the pump, comprising:

(a) priming pump means for developing a partial vacuum in said pumping chamber and causing liquid to be drawn into said pumping chamber to evacuate air therefrom;

(b) sensing means for detecting the interface between the liquid and air in an area in or above said pumping chamber for activating and deactivating said priming pump means; and

(c) said sensing means comprising a low sensitivity capacitive proximity sensor means having a sensing face for sensing the relative movement of said interface between the liquid and air, said sensing face being at least 30 degrees from a horizontal orientation.

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5,035,584

## VARIABLE-DELIVERY VANE-TYPE ROTARY COMPRESSOR

Seiji Akaike; Toshinori Aihara, and Yukio Sudo, all of Atsugi, Japan, assignors to Atsugi Motor Parts Co., Ltd., Kanagawa, Japan

Filed Oct. 28, 1987, Ser. No. 114,652
Claims priority, application Japan, Oct. 31, 1986, 61-168556; Nov. 4, 1986, 61-170038; Dec. 3, 1986, 61-187105
Int. Cl.[5] F04B 49/00, 49/02
U.S. Cl. 417—295 14 Claims

1. A rotary compressor comprising:

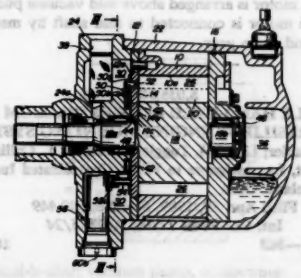
a compressor housing defining therein an internal space which includes a low-pressure chamber connected to a low-pressure fluid source and a high-pressure chamber connected to a load;

introducing means for introducing a low-pressure fluid into said low-pressure chamber;

compression means for compressing said low-pressure fluid to a predetermined higher pressure, said compression means including a compression chamber into which said low-pressure fluid is introduced for compression;

passage means for defining a by-pass passage establishing communication between said low-pressure chamber and said compression chamber, said by-pass passage establishing communication between said low-pressure chamber and said compression chamber, said by-pass passage being arranged to be exposable to essentially the entire cross-sectional area of said compression chamber so as to establish communication between said low-pressure chamber and said compression chamber;

rotary closure member associated with said by-pass passage for varying the open area and position at which said by-pass passage is exposed to said compression chamber so as



to control the amount of said low-pressure fluid by-passed from said compression chamber to said low-pressure chamber through said by-pass passage, said rotary closure member being a disk-shaped member; and

receiving means for defining a circular through opening for receiving therein said rotary closure member, said receiving means allowing said rotary closure member to rotate while the inner surface of said circular through opening being in contact with the outer periphery of said rotary closure member.

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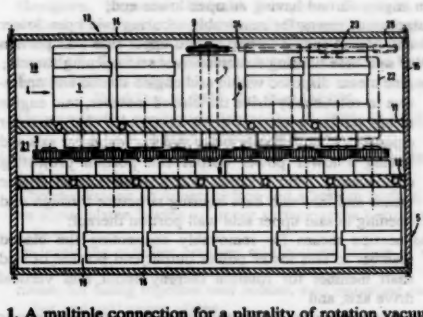
5,035,585

## MULTIPLE CONNECTOR FOR ROTATION VACUUM PUMPS

Hanns-Peter Berges, Koeln, and Wolfgang Leier, Bergisch-Gladbach, both of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Fed. Rep. of Germany

Filed Jul. 14, 1989, Ser. No. 379,868
Claims priority, application European Pat. Off., Jul. 14, 1988, 88111277.5
Int. Cl.[5] F04B 35/00
U.S. Cl. 417—362 5 Claims



1. A multiple connection for a plurality of rotation vacuum pumps, said pumps being arranged in two rows and sharing a common drive motor, wherein said multiple connection comprises the following:

each of said vacuum pumps comprises a toothed pump gear;

said drive motor comprises a toothed drive gear; and

said toothed pump gears and said toothed drive gear are arranged in a single row, and with their teeth drivingly intermeshed;

wherein said drive gear is located approximately in the center of said row;

said drive gear is connected to a shaft;

said vacuum pumps and said shaft are alternatingly arranged on opposite sides of said single row;

wherein said drive motor directly drives said shaft and is arranged, with respect to said single row, as are said vacuum pumps;

said drive motor is arranged above said vacuum pumps; and

said drive motor is connected to said shaft by means of a chain and chain gear.

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**5,035,586**

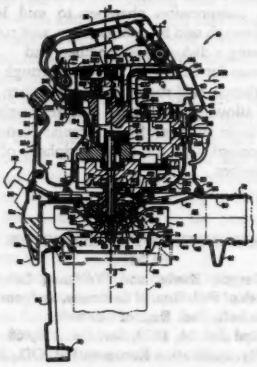
**PORTABLE HAND-HELD BLOWER/VACUUM UNIT WITH RESILIENT ENGINE MOUNTING SYSTEM**

**Jeffery G. Sadler; Lloyd H. Tuggle, and Imack L. Collins, all of Shreveport, La., assignors to White Consolidated Industries, Inc., Cleveland, Ohio**

**Filed Apr. 19, 1989, Ser. No. 340,449**

**Int. Cl.[5] F04B *17/00*; A47L *5/24***

**U.S. Cl. 417—363** **16 Claims**



1. Apparatus for rotationally driving a bladed member disposed within a base housing structure having an upper side wall portion with an opening formed therethrough, said apparatus comprising:

an engine shroud having an open lower end;

attachment means for removably securing said open lower end of said engine shroud to said upper side wall portion of said base housing structure over said opening therein;

engine means disposed within said engine shroud and operative to rotationally drive the bladed member, said engine means having a vertical drive axis, and a shaft member extending longitudinally along said vertical drive axis and having a lower power output end portion projecting downwardly from a lower end portion of said engine means and into said base housing structure through said opening in said upper side wall portion thereof;

connection means for removably connecting the bladed member to said lower power output end portion of said shaft member for rotation thereby about said vertical drive axis; and

mounting means for resiliently supporting said engine means within said engine shroud in a manner preventing appreciable rigid contact between said engine means and both said engine shroud and the base housing structure to thereby substantially diminish engine means operating vibration transmitted to said engine shroud and the base housing structure, said resilient mounting means including:

a first resilient support means vertically supporting a first section of said engine means on said engine shroud and relatively freely permitting pivotal movement of said engine means with respect to said engine shroud only about a second axis generally transverse to said vertical drive axis, but resiliently resisting any only movements of said first engine means section relative to said engine shroud, and

a second resilient support means vertically supporting a second section of said engine means spaced vertically apart from said first section thereof, said second support means resiliently resisting pivotal movement of said engine means with respect to said engine shroud about said second axis.

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**5,035,587**

**FUEL PUMPING APPARATUS**

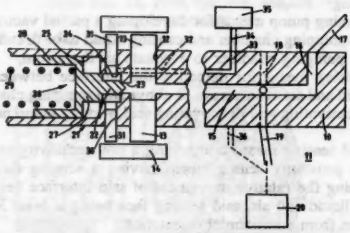
**Peter A. G. Collingborn, Kent, England, assignor to Lucas Industries, Solihull, England**

**Filed Nov. 15, 1990, Ser. No. 614,373**

**Claims priority, application United Kingdom, Nov. 23, 1989, 8925477**

**Int. Cl.[5] F04B *29/00, 23/00*; F02M *37/04***

**U.S. Cl. 417—462** **2 Claims**



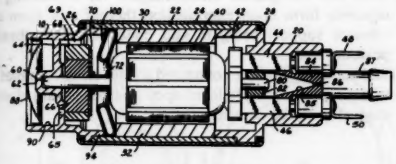
1. A fuel injection pumping apparatus comprising a plunger reciprocable within a bore, an outlet from the bore and through which fuel can be displaced during the inward movement of the plunger under the action of cam means and a spill valve operable during the inward movement of the plunger to spill fuel from the bore thereby to determine the quantity of fuel supplied through the outlet said spill valve including a valve member engagable with a seating surrounding a spill passage from the bore, resilient means biasing the valve member into engagement with the seating, and actuating piston coupled to said valve member, said actuating piston being slidable in a first cylinder into which said spill port opens, the actuating piston defining a surface against which fluid pressure in said first cylinder can act to lift the valve member from the seating, a second cylinder of larger diameter than the first cylinder and into which the first cylinder opens, a storage piston slidable in the second cylinder and a control valve for controlling the application of fluid pressure to said surface of the actuating piston, the arrangement being such that when said control valve is operated to apply a fluid pressure to said surface the valve member will be lifted from the seating, the fuel flowing from the bore into the first cylinder and after a predetermined movement of the actuating piston into the second cylinder.

5,035,588

## ROTARY FUEL PUMP WITH PULSE MODULATION

Charles H. Tuckey, Cass City, Mich., assignor to Walbro Corporation, Cass City, Mich.

Filed Jun. 6, 1990, Ser. No. 533,899
Int. Cl.[5] F04B 11/00
U.S. Cl. 417—540 4 Claims



1. In a rotary fuel pump that includes an elongate housing with an inlet at one end and an outlet at the other end, a rotary pump at the inlet end and an electric motor rotating on the axis of said housing within the housing to drive the pump, that improvement which comprises a hollow and sealed pulse reducing chamber formed of flexible plastic walls with a gas such as air captured within the chamber at a pressure above ambient atmospheric pressure, said chamber being frusto-conically toroidal in shape and being disposed around a rotating drive shaft of said pump.

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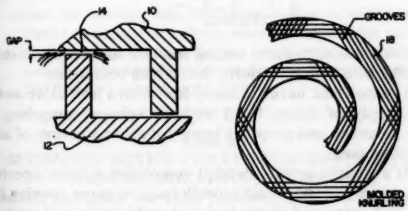
5,035,589

## METHOD AND APPARATUS FOR REDUCING SCROLL COMPRESSOR TIP LEAKAGE

Howard H. Fraser, Jr., Lafayette; William J. Boonzha, Jordan, both of N.Y., and Shahrokh Etemad, Stratford, Conn., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Jan. 16, 1990, Ser. No. 465,375
Int. Cl.[5] F04C 18/04, 27/00; F16J 15/447
U.S. Cl. 418—1 2 Claims



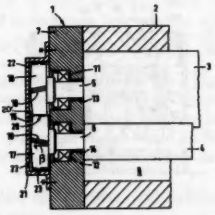

1. A scroll compressor for compressing fluids of the type including a shell which contains a fixed scroll and an orbiting scroll which is disposed off the axis of the fixed scroll for revolving about the axis of the fixed scroll, rotation-prevention means for holding the orbiting scroll against rotation but permitting it to revolve in an orbiting motion, drive means mounted within the shell for driving said orbiting scroll in its orbiting motion, wherein the improvement comprises a plurality of linear grooves formed sequentially along the scroll wrap tip, at least a portion of each groove intersecting a portion of an adjacent groove said grooves being disposed around the periphery of the scroll wrap substantially at right angles to the direction of leakage flow across the scroll wrap tips of the fluid being compressed, so that the leakage of the fluid being compressed across the scroll tips from high to low pressure sides is reduced.

5,035,590

## DOUBLE-SHAFT VACUUM PUMP WITH SYNCHRONIZATION GEARS

Ralf Steffens, Köln, Fed. Rep. of Germany, assignor to Leybold Aktiengesellschaft, Köln, Fed. Rep. of Germany

Division of Ser. No. 167,159, Mar. 11, 1988, abandoned. This application Feb. 15, 1990, Ser. No. 481,746
Claims priority, application European Pat. Off., Mar. 13, 1987, EP 87103
Int. Cl.[5] F04C 18/18, 29/02, 29/04; F16H 55/08
U.S. Cl. 418—206 22 Claims



1. A double-shaft vacuum pump, comprising:
a housing having a pump chamber and a side chamber;
pistons which rotate without contact in the pump chamber; and
a pair of synchronization gears in the side chamber, the synchronization gears being connected to respective pistons, the synchronization gears having teeth with profiles which are shaped so that contact of the tooth flanks is limited to the immediate vicinity of the pitch circle,
wherein the teeth of at least one of the synchronization gears are truncated involute teeth and the effective tooth height above the pitch circle on said at least one of the synchronization gears ranges from one-hundredth to two-fifths of the modulus m, and
wherein at least one of the teeth of said at least one of the synchronization gears has a flank with a support area adjacent its top land, and a flank profile which is set back from an involute shape at a region of the support area.

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5,035,591

## VULCANIZING APPARATUS

Koji Soeda, Kobe; Yoshiya Kubota; Shoji Okamoto, both of Toyota; Akinori Kubota, Kobe; Michihito Kobayashi, Toyota; Masaaki Ijiri, Aichi; Susumu Ozawa, Hekinan; Kiyoshi Tomosada, Toyota; Nobuhiko Irie, Nagasaki; Akira Hasegawa, Nagasaki; Hideaki Katayama, Nagasaki; Toshifumi Murakami, Nagasaki, and Katsuyoshi Sakaguchi, Nagasaki, all of Japan, assignors to Sumitomo Rubber Industries, Ltd., Kobe and Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, both of, Japan

Filed Dec. 4, 1989, Ser. No. 444,909
Claims priority, application Japan, Dec. 8, 1988, 63-311334
Int. Cl.[5] B29C 35/04
U.S. Cl. 425—40 2 Claims

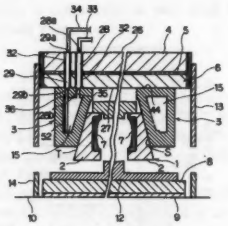
1. A vulcanizing apparatus comprising:
a bolster having an upper surface and a bottom surface;
an upper platen having an upper surface and a bottom surface;
an insulating member between said bottom surface of said bolster and said upper surface of said upper platen;
means for fixing together said bolster, said insulating member and said upper platen;
a first penetrating passage and a second penetrating passage extending form said upper surface of said bolster to said bottom surface of said upper platen;
a mold member having a jacket portion for heating;
a locking mechanism by which said mold member is removably coupled to said upper platen;

a steam inlet pipe coupled to an upper open end of said first penetrating passage;

a steam outlet pipe coupled to an upper open end of said seocnd penetrating passage;

a steam supply passage formed at an upper portion of said mold member communicating with said jacket portion of said mold member, wherein said steam supply passage communicates with a bottom open end of said first penetrating passage;

a steam exhaust passage formed at said upper portion of said mold member communication with said jacket portion of



said mold member, wherein said steam exhaust passage communicates with a bottom open end of said second penetrating passage;

inner tubes which respectively are longer than said first and second penetrating passages and slide internally along said first and second penetrating passages; and

pusher means for respectively pressing with appropriate pressure said inner tubes against a periphery of a top open end of said steam supply passage of said mold member, and against a periphery of a top open end of said steam exhaust passage of said mold member.

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**5,035,592**

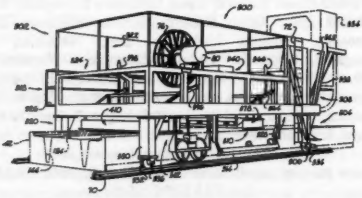
## APPARATUS FOR CONCRETE SUPPLY AND FORM VIBRATION

**William Lowndes, III; Francis V. Gay, III, and Benjamin A. Gay, all of Spartanburg, S.C., assignors to Lowndes Corporation, Spartanburg, S.C.**

**Division of Ser. No. 131,653, Dec. 11, 1987, Pat. No. 4,884,958. This application Sep. 11, 1989, Ser. No. 405,679**

**Int. Cl.[5] B28B** *13/02, 1/08*

**U.S. Cl. 425—64** **20 Claims**



1. An apparatus for pouring concrete into a concrete form, comprising:

a frame structure positionable above the concrete form;

support means provided on said frame structure for supporting said frame structure above the concrete form for movement therealong;

concrete supply means provided on said frame structure for supplying concrete to the concrete form; and

concrete form vibration means provided on said frame structure and contactable with the concrete form for vibrating the concrete form and settling the concrete supplied thereto as said frame structure moves along the concrete form; wherein said concrete form vibration means comprises

at least one vibrator support connected to said frame structure and movable between a concrete form vibrating position and a retracted position;

vibrator means connected to said vibrator support for contacting and vibrating the concrete form when said vibrator support is in said concrete form vibrating position, said vibrator means remaining in contact with the concrete form for vibrating the concrete form as said frame structure moves along the concrete form;

at least one energizable electromagnet for contacting the concrete form upon energization thereof and upon said vibrator support being in said concrete form vibrating position; and

a fluid actuated vibrator connected to said electromagnet for vibrating the concrete form upon contact of said electromagnet with the concrete form.

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**5,035,593**

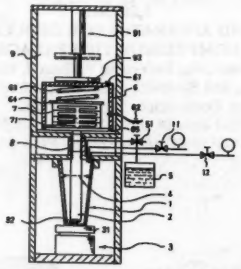
## PRESSURIZED SLURRY CASTING MACHINE FOR PRODUCING CERAMIC ARTICLES

**Liang Y. Huang, Taipei, Taiwan, and San Y. Chen, Kaohsiung, China, assignors to Industrial Technology Research Institute, Taiwan, Taiwan**

**Filed Nov. 7, 1989, Ser. No. 432,787**

**Int. Cl.[5] B29C** *39/42*

**U.S. Cl. 425—85** **6 Claims**



1. A pressurized slurry casting machine for casting ceramic articles with a ceramic slurry feed which comprises:

(1) a feed tank having a slurry feed with a leak valve and a supply of slurry, fitted with an agitator comprising a propeller; said propeller being just above a bottom of said feed tank;

(2) a straight vertical conduit comprising a lower opening positioned above said propeller and an upper opening for delivering said slurry feed to a mold above said vertical conduit, said vertical conduit being connected with said feed tank in an air tight relation except in the openings of said vertical conduit;

(3) means for biasing said mold through the action of a pneumatic piston and a spring sequentially above said mold above said upper opening of said vertical conduit with the mold cavity of said mold connected with said vertical conduit in an air tight relation;

(4) a pressurizing system fixedly connected to said feed tank and which has a valve means capable of applying positive pressure in said feed tank to force said slurry upwardly in said vertical conduit; and

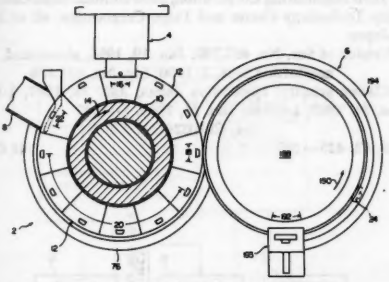
(5) a vacuum system fixedly connected to said feed tank and which has a valve means capable of applying negative pressure in said feed tank for a degassing of said slurry prior to molding.

**5,035,594**

## COMPRESSION MOLDING APPARATUS

**Kashiwa Murayama, Fujisawa, and Nobu Utsunomiya, Hiratsuka, both of Japan, assignors to Toyo Seikan Kaisha, Ltd., Tokyo, Japan**

**Filed Aug. 11, 1989, Ser. No. 392,424**
**Int. Cl.[5] B29C *39/10, 45/14***
**U.S. Cl. 425—116** **6 Claims**



1. A compression molding apparatus for forming a plastic grip ring and simultaneously linking it integrally to a linking protruding piece of a container closure body, said linking protruding piece having a free end portion; wherein

the apparatus include a mold composed of a first mold portion and a second mold portion adapted to be opened or closed by being moved relative to each other in a predetermined direction,

the first mold portion has an accommodating space for receiving the closure body and a first mold cavity extending in a ring-like shape, said accommodating space being located where a closure body received therein will have its free end portion projecting into the first mold cavity,

the second mold portion has a main part including a second mold cavity extending in a ring-like shape and a conduit means for receiving a plastic material, said conduit means communicating with said second mold cavity and extending in said predetermined direction from the second mold cavity,

a compression rod slidably inserted into the conduit means, and

means for moving said compression rod in said conduit means to compress a plastic material fed into the conduit means and mold it into the grip ring having a shape corresponding to a molding space defined by the cooperation of the first and second mold cavities.

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**5,035,595**

## SPINNERET DEVICE FOR CONJUGATE FIBERS OF ECCENTRIC SHEATH-AND-CORE TYPE

**Sadaaki Nakajima, and Taiju Terakawa, both of Shiga, Japan, assignors to Chisso Corporation, Japan**

**Filed Feb. 13, 1990, Ser. No. 479,249**
**Claims priority, application Japan, Feb. 15, 1989, 1-35780**
**Int. Cl.[5] B29C *47/30***
**U.S. Cl. 425—131.5** **6 Claims**

1. A spinneret assembly for forming conjugate fibers of eccentric sheath-and-core type, comprising:

means forming a core liquid reservoir and a separate sheath liquid reservoir;

a first distribution plate having a plurality of parallel introducing through holes, with a first plurality of said introducing holes being in fluid communication with said core liquid reservoir and a second plurality of said introducing holes being in fluid communication with said sheath liquid reservoir;

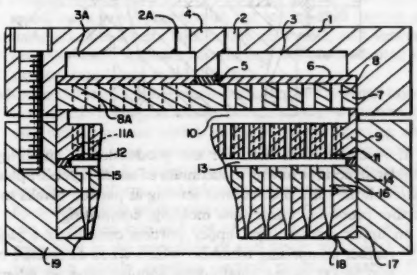
a second distribution plate being parallel to said first distribution plate;

a filter for filtering said core and sheath liquids, respectively, disposed between said first distribution plate and said reservoir forming means, wherein said first distributing plate supports said filter;

said first and second distribution plates having means forming therebetween a plurality of parallel separate grooves, with a first plurality of said grooves in fluid communication with said first plurality of introducing holes on the side of said first distribution plate opposite from said core liquid reservoir and a second plurality of said grooves in fluid communication with said first plurality of introducing holes on the side of said first distribution plate opposite from said core liquid reservoir and a second plurality of said grooves in fluid communication with said second plurality of introducing holes on the side of said second distribution plate opposite from said sheath liquid reservoir;

said second distribution plate having a plurality of through core liquid pressure control holes communicating on one side with said first plurality of grooves and further having a plurality of through sheath liquid pressure control holes communicating on one side with said second plurality of grooves;

a spinning plate spaced from and parallel to said second distribution plate;



an eccentricity-controlling plate having a flat surface engaging a flat surface of said spinning plate on one side thereof and having a plurality of grooves for eccentricity on the other side thereof, said spinning plate having a fixed pattern of a plurality of through spinning holes and said eccentricity-controlling plate having a plurality of core liquid introducing holes coaxial with said through spinning holes and with said core liquid pressure control holes, respectively;

said second distribution plate and said eccentricity-controlling plate having adjacent flat parallel unobstructed surfaces interrupted only by said holes and grooves for eccentricity to form therebetween a narrow continuous mixing zone for combining said core liquid and sheath liquid;

a spacer for forming said mixing zone between said distribution plate and said eccentricity-controlling plate;

said sheath liquid pressure control holes entering into said mixing zone in a fixed pattern arranged in position of a rectangular lattice; and

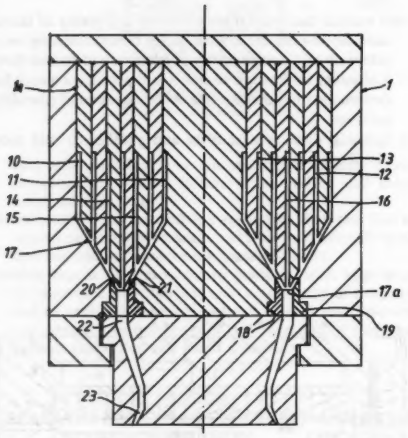
said core liquid pressure control holes entering into said mixing zone in a fixed pattern arranged in position at an intersection of two diagonals of a quadrilateral formed by four adjacent sheath liquid pressure control holes of the rectangular lattice.

5,035,596

## COEXTRUSION HEAD

Harald Pohl, Berlin, Fed. Rep. of Germany, assignor to Bekum Maschinenfabriken GmbH, Berlin, Fed. Rep. of Germany

Continuation of Ser. No. 205,070, Jun. 10, 1988, abandoned.
This application Dec. 19, 1989, Ser. No. 456,194
Claims priority, application Fed. Rep. of Germany, Jun. 22, 1987, 3720560
Int. Cl.[5] B29C 47/30
U.S. Cl. 425—133.1 16 Claims




1. A coextrusion head for the production of multi-layer tubular structures having a maximum of seven layers of plastic material, the tubular structures serving as parison blanks to be further processed using blow molding, comprising:

an upper portion, said upper portion containing a jacket further comprising members which when assembled into said jacket define longitudinal annular passages wherein layers for the multi-layer tubular structures are formed;

two inclined annular passages, each of said inclined annular passages having as an upper surface said jacket's bottom facing side and as a lower surface said upper portion's opposing internal walls, portions of said longitudinal annular passages opening into two of said two inclined annular passages;

an injection borehole for introduction of material into each said longitudinal annular passage in said upper portion;

a lower portion having a nozzle for extruding the multilayered tabular structure; and

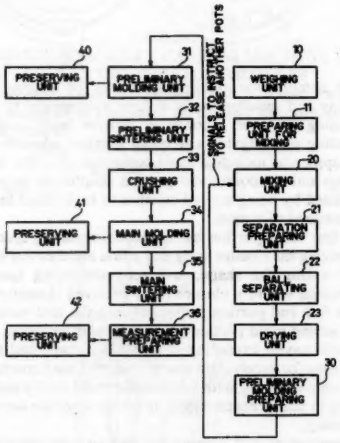
an inside core ring and an outside nozzle ring exchangeably arranged between said upper portion and said lower portion adjacent where said two inclined annular passages join an inlet opening to said nozzle wherein said inside core ring and said outside nozzle ring can have a nonobstructing function in that their head segments are spaced from said bottom facing side of said jacket to permit material flow in said two inclined annular passages where the layers that form the multi-layer tabular structure are joined or an obstructing function in that said head segment of said inside core ring or of said outside nozzle ring engages said bottom facing side of said jacket thereby preventing the flow of material in a corresponding one of said two inclined annular passages.

5,035,597

## APPARATUS FOR MANUFACTURING MULTI-ELEMENT SINTERED MATERIAL

Shoji Tanaka, Tokyo; Hisao Yamauchi, Urayasu; Yukio Yamada, Funabashi; Masayoshi Ohnuki, Ichihara; Etsuji Morita, Funabashi; Mitsunobu Toyoshima, Sakura; Yasuo Wada, Tokyo; Hirotaka Hinoshita, Mobara; Wataru Ikeda, Chiba; Etsuji Aihara, Saitama; Tutomu Kobayashi, Tokyo, and Kuniaki Suguro, Kawaguchi, all of Japan, assignors to Toyo Engineering Corporation; International Superconductivity Technology Center and Taiyo Corporation, all of Tokyo, Japan

Division of Ser. No. 467,750, Jan. 19, 1990, abandoned. This application Nov. 2, 1990, Ser. No. 611,438
Claims priority, application Japan, Jan. 24, 1989, 1-14545; Jan. 24, 1989, 1-14546; Jan. 24, 1989, 1-14547
Int. Cl.[5] B29C 45/76
U.S. Cl. 425—135 11 Claims




1. A system for manufacturing a multi-element sintered material comprising:

means for moving a first container to a first location;

means for automatically weighing and supplying powdery ingredients of said sintered material into said first container at said first location;

means for automatically introducing grinding media and a volatile liquid into said first container;

means for sealing said first container with a lid bearing a first code regarding the ingredients contained in the first container;

means for reading said first code;

means for moving said sealed container in a manner to cause mixing of the ingredients contained therein;

means for removing said lid from said first container;

means for separating said grinding media from the mixed ingredients;

means for transferring said mixed ingredients into a second container bearing a second code regarding the contents of said second container;

mean for reading said second code;

means for comparing said first code with said second code;

means for heating said second container to dry said mixed ingredients contained therein;

means for preliminarily molding said dried, mixed ingredients with a mold assembly into a sample; and

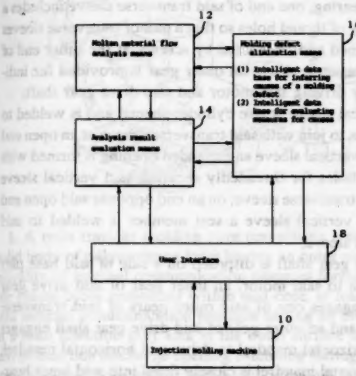
means for storing information regarding the composition of said sample.

5,035,598

## OPTIMUM MOLDING CONDITION SETTING SYSTEM FOR INJECTION MOLDING MACHINES

Shigeru Fujita; Hideo Saito; Katsuyuki Yamamoto; Satoshi Endo, and Fumio Kamahora, all of Shizuoka, Japan, assignors to Toshiba Machine Co., Ltd., Tokyo, Japan

Filed Nov. 7, 1989, Ser. No. 433,048
Claims priority, application Japan, Nov. 9, 1988, 63-283084
Int. Cl.[5] B29C *45/77*
U.S. Cl. 425—144 8 Claims




1. Apparatus for setting optimum molding conditions in an injection molding machine, comprising:

means for analyzing a flow of molten material within a model mold, said analyzing means assessing cooling of said resin flow and structural strength of a molded product resulting from said flow within said model mold;

means for evaluating results produced by said analyzing means, said evaluating means determining an initial molding condition to be set in an injection molding machine based on said results from said analyzing means, said evaluating means further providing an operating range of a molding condition as well as data indicative of an average thickness of a predetermined part of the molded product;

means for eliminating a molding defect comprising a first intelligent data base for inferring causes of an input molding defect in accordance with a relation between the molding defect and a mold or resin condition, and a second intelligent data base for calculating a correction value to be entered in the injection molding machine, said correction value being based on the causes of the molding defect inferred by the first intelligent data base, said first intelligent data base including prioritized corrective measures corresponding to a range of possible molding defects to be input into the defect eliminating means, and said second intelligent data base being adapted to convert said corrective measures to said correction value; and

interface means for receiving data indicative of defects in molded products produced in the injection molding machine, and transmitting said data to the defect eliminating means and to the evaluation means, said interface means also receiving the initial molding condition from the evaluating means and transmitting the initial molding condition to the injection molding machine;

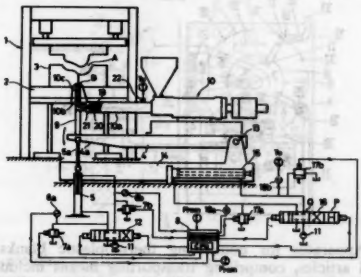
said evaluating means resetting the initial molding condition in accordance with the correction value received from said defect eliminating means, and said interface means receiving a reset correction value from the evaluating means and transmitting the reset correction value to the injection molding machine.

5,035,599

## COMBINED INJECTION-MOLDING AND PRESSING MACHINE

Noboru Harashima, Fujisawa; Kazuhiro Mimura, Hiratsuka; Yosuke Sasaki, Zama; Hideaki Okubo, Hiratsuka; Makoto Nogawa, Hiratsuka, and Satoshi Fujimoto, Hiratsuka, all of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Japan

PCT No. PCT/JP89/00086, § 371 Date Apr. 9, 1990, § 102(e) Date Apr. 9, 1990, PCT Pub. No. WO 90/02032, PCT filed Aug. 23, 1989, Ser. No. 474,111
Claims priority, application Japan, Aug. 31, 1988, 63-115510; Sep. 29, 1988, 63-245663
Int. Cl.[5] B29C *45/80*
U.S. Cl. 425—150 18 Claims



1. A combined injection-molding and pressing machine comprising:

a vertical press adapted for opening and closing of an upper mold and a lower mold, with the lower mold having an underside and a resin inlet in said underside, said vertical press having a stationary horizontal die plate adapted to support said lower mold thereon;

a horizontal injection apparatus including an L-shaped injection nozzle having an outlet, a resin passageway through said nozzle to said outlet, and a valve for opening and closing said resin passageway, said injection apparatus being adapted for injection of molten resin through said nozzle, a platform, said injection apparatus being carried by said platform so that the outlet of said injection nozzle can be moved into and out of positive abutment with a resin inlet in the underside of said lower mold with said injection nozzle exerting contact pressure against the underside of said lower mold during such abutment when said lower mold is supported on said die plate;

a base movable horizontally toward and away from said vertical press, a first hydraulic actuator for moving said base horizontally toward said vertical press so as to position said injection nozzle under said die plate and for moving said base horizontally away from said vertical press so as to withdraw said injection nozzel from under said die plate; said platform being movably supported on said base so as to provide for relative vertical motion of said injection nozzle with respect to said base, a second hydraulic actuator, said platform being movable by said second hydraulic actuator so as to move said injection nozzle vertically into and out of positive abutment with the resin inlet in the underside of said lower mold when said lower mold is supported on said die plate and when said injection nozzle is positioned under said die plate by said base;

a hydraulic circuit which includes said first and second hydraulic actuators and a pressure source to supply hydraulic fluid under pressure to said first and second hydraulic actuators;

a first detection means for producing a first output signal which is responsive to the pressure at which said injection nozzle contacts said lower mold positioned on said die plate; and

control means for controlling said second hydraulic actuator in response to said first output signal to maintain a prede-

termined contact pressure between said injection nozzle and said lower mold positioned on said die plate during the injection of molten resin through said nozzle.

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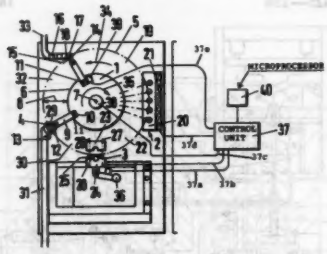
**5,035,600**

## APPARATUS FOR CONVERTING THERMOPLASTIC BLANKS INTO SHAPED ARTICLES

**Hermann Voss, Hamburg, Fed. Rep. of Germany, assignor to Nissei ASB Machine Co., Ltd., Nagano, Japan**

**Filed Feb. 23, 1990, Ser. No. 484,566**
**Int. Cl.[5] B26C *49/06, 49/36, 49/78***
**U.S. Cl. 425—161** **20 Claims**




1. Apparatus for converting thermoplastic blanks into shaped articles, comprising transporting means including a conveyor rotatable about a predetermined axis; supporting means mounted on said conveyor for advancement along an endless path in response to rotation of said conveyor in a predetermined direction; means for supplying blanks to said supporting means in a first portion of said path; means for heating blanks during advancement of said supporting means along a second portion of said path downstream of said first portion; an open-and-shut mold adjacent a third portion of said path downstream of said second portion and having means for converting blanks into shaped articles; and means for receiving shaped articles from said supporting means in a fourth portion of said path between said third and first portions.

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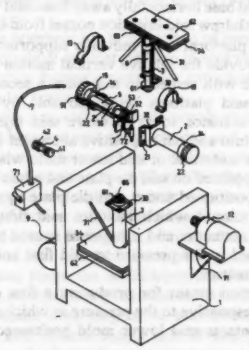
**5,035,601**

## HOLLOW FORMING MACHINE CAPABLE OF ROTATING MOULD IN BOTH HORIZONTAL AND VERTICAL DIRECTION

**Chao-Tung Lin, 3FL, No. 125, Lane 101, Ta Tung South Road, San Chung City, Taipei County, Taiwan**

**Filed Feb. 21, 1990, Ser. No. 482,488**
**Int. Cl.[5] B28B *21/30;* B29C *41/06***
**U.S. Cl. 425—429** **1 Claim**



1. A hollow forming machine capable of rotating moulds in both a horizontal and vertical direction comprising a base part, a transverse sleeve, a vertical sleeve, a drive gear shaft, a horizontal mandrel, a vertical mandrel, and an air pipe, wherein:

said base part includes a pair of parallel side-boards having a horizontal support board welded therebetween, a motor seat is welded to said base part for mounting a motor thereon, two securing members are used to secure an outer bearing and an inner bearing on said sideboards;

said transverse sleeve is cylinder-shaped and fitted into said outer bearing, one end of said transverse sleeve includes a plurality of thread holes so that a pair of transverse sleeves are aligned and connected by screws; at the other end of said transverse sleeve an outer gear is provided for individually driving said motor and said drive gear shaft;

said vertical sleeve is also cylinder-shaped and is welded to supports to join with said transverse sleeve; at an open end of said vertical sleeve an expanded opening is formed with thread holes for threadedly securing said vertical sleeve on said transverse sleeve; on an end opposite said open end of said vertical sleeve a seat member is welded to said vertical sleeve;

said drive gear shaft is disposed on a side of said base part opposite to said motor, an inner gear of said drive gear shaft engages one of said outer gears of said transverse sleeve, and an outer gear of said drive gear shaft engages said horizontal mandrel to drive said horizontal mandrel;

said horizontal mandrel is closely fitted into said inner bearing and is received in said transverse sleeve; a spur gear mounted on an outer end of said horizontal mandrel engages said outer gear of said drive gear shaft, and a first bevel gear mounted on an inner end of said horizontal mandrel engages said vertical mandrel; said air pipe being provided within a hollow pipe in said horizontal mandrel;

said vertical mandrel is received in said vertical sleeve with a bevel gear mounted on a lower end thereof which engages said first bevel gear of said horizontal mandrel to drive an upper seat member of said vertical mandrel; a plurality of balls are positioned between said upper seat member and said seat member for rotational displacement of said upper seat member; a plurality of threaded holes are formed within said upper seat member for mounting a mould seat; said air pipe being received in a hollow pipe within said vertical mandrel; and

one end of said air pipe being connected to and in fluid communication with an air extractor having a control valve to control the extraction and insert of air therethrough; said air pipe is further connected to and in fluid communication with two sets of mould seats for extraction and air insert simultaneously provided in one mould, whereby when said motor is activated, said transverse sleeve is driven to rotate via engagement of a front gear of said motor with said outer gear of said transverse sleeve; and, by threadedly engaging said vertical and said transverse sleeves and welding said vertical sleeve and said supports, said mould seats being synchronously rotatable, said drive gear shaft being a driving media between said transverse sleeve and said horizontal mandrel including driven engagement of said two bevel gears of said horizontal and said vertical mandrels, whereby a vertical rotation of said motor is translated into a horizontal rotation of said vertical mandrel and said mould seat threaded to said upper seat member welded to said vertical mandrel provides for said mould seat to be rotated both in a horizontal and vertical direction.

**5,035,602**

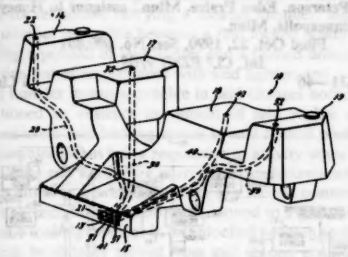
## RESIN TRANSFER MOLDING CORE AND PREFORM

**Carl F. Johnson, Belleville, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Continuation of Ser. No. 61,762, Jun. 15, 1987, abandoned. This application May 14, 1990, Ser. No. 523,304**

**Int. Cl.[5] B29C *33/10, 45/14***

**U.S. Cl. 425—468** **14 Claims**



1. A resin transfer molding core comprising a substantially solid body of polyurethane foam having an outer surface and a plurality of internal communication passages formed by flexible plastic tubes embedded within said core, at least a first of said internal communication passages having an inlet opening at a resin injection port area in the outer surface of said core and at least one discharge opening extending through the outer surface of said core, and at least a second of said internal communication passages having an inlet opening at said resin injection port area and having at least one discharge opening extending through the outer surface of said core.

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**5,035,603**

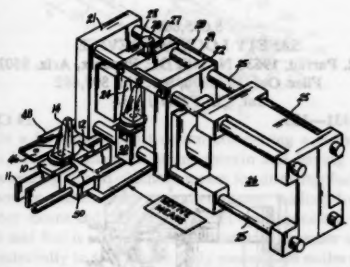
## APPARATUS FOR ALIGNING A PARISON WITH A BLOW MOLD

**Rick Unterlander, Holland Landina, and Tai C. Fok, Mississauga, both of Canada, assignors to Husky Injection Molding Systems Ltd., Bolton, Canada**

**Filed Mar. 5, 1990, Ser. No. 487,854**

**Int. Cl.[5] B29C *49/42***

**U.S. Cl. 425—522** **8 Claims**



1. Apparatus for aligning a parison with a blow mold which comprises: a blow mold for forming a blown article from a parison; a mandrel including a flat plate with a projection thereon for holding the parison to be blown in a predetermined position, wherein said mandrel is rotatable so that the parison can be rotated; means for moving the mandrel and parison into the blow mold; location means for rotating the mandrel and parison thereon into alignment with the blow mold including an eccentric cam connected to the plate and depending therefrom, and a movable arm engagable with the cam upstream of the blow mold, wherein the arm rotates the cam and mandrel into alignment with the blow mold thereby aligning the parison with the blow mold; and means for maintaining the alignment in the blow mold.

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**5,035,604**

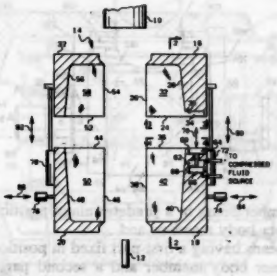
## BLOW MOLDING AND COMPRESSION MOLDING OF AN ARTICLE

**John R. Rathman, and Donald L. Peters; Jimmie L. Dean, all of Bartlesville, OK, assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed May 4, 1990, Ser. No. 519,623**

**Int. Cl.[5] B29C *49/42***

**U.S. Cl. 425—525** **16 Claims**



1. A molding apparatus comprising:

extrusion means for extruding a molten generally tubular parison having a predetermined wall thickness;

mold means for receiving said extruded parison, said mold means including a first interior surface portion which defines a first cavity portion and a second interior surface portion which defines a second cavity portion and also including a recess generally in alignment with said first cavity portion;

blow means for injecting blow gas into the interior of said parison within said mold means so as to expand said parison within each of said cavity portions; and

a compression member, having an exterior surface, which is mounted in said mold means so as to be reciprocable between a retracted position in which at least a portion of said compression member is disposed within said recess to an extended position in which at least a part of said compression member portion is outside of said recess, wherein in said extended position at least a portion of the exterior surface of said compression member is capable of being positioned to be closely adjacent to said first interior surface portion so as to press only a portion of said expanded parison of predetermined wall thickness against said first interior surface portion and thereby compression mold said parison portion.

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**5,035,605**

## NOZZLE SHUT-OFF VALVE FOR AN INJECTION MOLDING MACHINE

**Alex Dinerman, and Norman L. Steffens, both of Cincinnati, Ohio, assignors to Cincinnati Milacron Inc., Cincinnati, Ohio**

**Filed Feb. 16, 1990, Ser. No. 481,018**

**Int. Cl.[5] B29C *45/23***

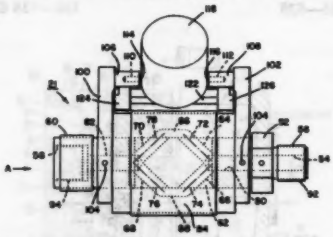
**U.S. Cl. 425—564** **25 Claims**

1. An injection molding machine comprising a nozzle shut-off valve for selectively opening and closing an injection outlet of a plastication barrel of the injection molding machine, said valve comprising:

an inner body member having a longitudinal axis and first and second ends spaced from each other along the longitudinal axis, the first end having an inlet opening and the second end having an outlet opening, and the inner body member further having an outer surface with a first opening in fluid communication with the inlet opening and a

second opening in fluid communication with the outlet opening;

an outer member surrounding the inner body member, the outer member having an inner surface adapted to be slidably positioned on the outer surface of the inner body member to permit relative sliding movement between the inner body member and the outer member, the outer member further having communication means for providing fluid communication between the first and second openings of the inner body member in response to the



outer member being in a predetermined position relative to the inner body member; and

actuation means having a first part fixed in position relative to the inner body member and a second part movable relative to the first part and operatively connected with the outer member for shifting the outer member between a first position wherein thee is communication between the inlet opening and the outlet opening of the inner body member, and a second position wherein communication between the inlet opening and the outlet opening is precluded.

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**5,035,606**

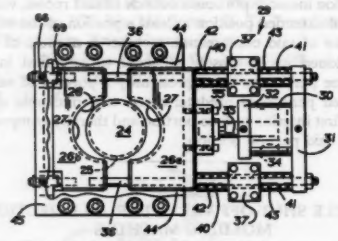
**HIGH TONNAGE RIM PRESS**

**Paul Zakich, Akron, Ohio, assignor to The Dow Chemical Company, Midland, Mich.**

**Continuation-in-part of Ser. No. 318,574, Mar. 3, 1989, Pat. No. 4,944,669. This application Mar. 30, 1990, Ser. No. 502,087**

**Int. Cl.[5] B29C *45/66***

**U.S. Cl. 425—569** **6 Claims**



1. A press having a fixed base, a locking rod mounted on said base, said rod having a plurality of annular serrations spaced along its length, a carrier movable along said rod, and means for locking said carrier against movement along said rod comprising a pair of locking dogs mounted on said carrier for moving to and from locking engagement with opposite sides of said rod, said dogs having serrated recesses for receiving said opposite sides and mating at said locking engagement with the serrations of said rod, first spring means interposed between portions fixed respectively to said carrier and to one of said dogs for yieldingly urging said one dog to its locking engagement, second spring means interposed between portions fixed respectively to said carrier and to the other of said dogs for yieldingly urging said other dog to its locking engagement, and a pair of force exerting means movable simultaneously with respect to each other in opposite directions and connected with said dogs respectively for moving the latter simultaneously from their positions of locking engagement against the reaction of said first and second spring means.

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**5,035,607**

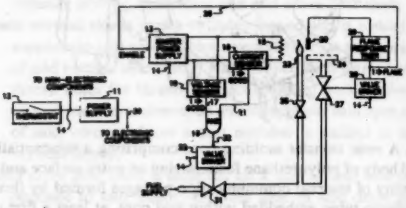
**FUEL BURNER HAVING AN INTERMITTENT PILOT WITH PRE-IGNITION TESTING**

**Scott M. Peterson, Eden Praire, Minn., assignor to Honeywell Inc., Minneapolis, Minn.**

**Filed Oct. 22, 1990, Ser. No. 600,801**

**Int. Cl.[5] F23Q *9/08***

**U.S. Cl. 431—46** **5 Claims**



1. In a fuel burner having a main burner and a pilot burner for lighting the main burner, an electrically-powered igniter for lighting the pilot burner, a source of electric energy, an igniter power supply receiving a demand signal and supplying power to the igniter responsive to the demand signal, a pilot sensor adjacent to the pilot burner and supplying a pilot signal responsive to presence of a pilot flame, and a main burner valve controlling flow of fuel to the main burner and opening responsive to the pilot signal, an improvement comprising:

(a) a pilot burner valve controlling flow of fuel to the pilot burner and opening responsive to a pilot valve control signal;

(b) igniter sensing means in sensing relation to the igniter for providing an igniter signal responsive to operation of the igniter; and

(c) pilot valve control means receiving the igniter signal, for providing the pilot valve control signal responsive to the igniter signal.

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**5,035,608**

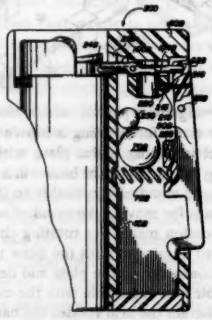
**SAFETY LOCKING DEVICE**

**Joseph R. Parren, 19638 N. 34th Dr., Phoenix, Ariz. 85027**

**Filed Oct. 10, 1990, Ser. No. 597,482**

**Int. Cl.[5] F23D *11/36***

**U.S. Cl. 431—153** **19 Claims**



13. A protective device for restricting access to a disposable

lighter having a housing, actuator and fuel lever, said device comprising:

(a) a body defining an opening receiving the lighter with the lighter being slidable relative to the body from a first protected position within the body in which the lighter is not readily accessible and a second position in which the article is at least partially extended from the body and is in an accessible position for use;

(b) said body defining a channel adjacent the said opening;

(c) rocker means carrying a locking member, said locking member moveable between a first locked position engaging a portion of said lighter and a second unlocked position out of engagement with said lighter; and

(d) tumbler means moveable in said channel normally positioned to obstruct movement of said rocker means to maintain said locking means in said locked position, said tumbler means being responsive to gravity when the body sleeve and lighter are moved to a predetermined inverted position to move said tumbler to a second position permitting said rocker means to be moved to a position placing said locking member in an unlocked position so the lighter can be slidably moved from said second position to said extended position of use permitting actuation of said fuel lever.

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**5,035,609**

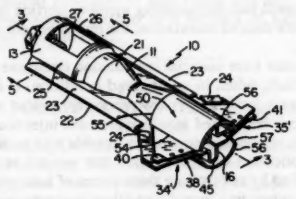
## JET BURNER CONSTRUCTION, HEATING APPARATUS UTILIZING THE JET BURNER CONSTRUCTION AND METHODS OF MAKING THE SAME

**Fred Riehl, Greensburg, Pa., assignor to Robertshaw Controls Company, Richmond, Va.**

**Filed Dec. 26, 1989, Ser. No. 456,722**

**Int. Cl.[5] F23D *14/58***

**U.S. Cl. 431—286** **10 Claims**



1. In a jet burner construction comprising a burner body means having a chamber means therein and having an inlet means leading to said chamber means for directing fuel from a fuel source therein and an outlet means leading from said chamber means and defining an outlet opening means through which said fuel is adapted to issue from said chamber means to burn externally to said burner body means, said outlet opening means having a central opening part and a plurality of spaced apart opening portions interconnected thereto and radiating outwardly therefrom whereby flows of fuel respectively issuing out of said portions and said central part of said outlet opening means merge together in a turbulent manner externally of said outlet opening means, the improvement wherein said burner construction comprises flame retainer means carried by said body means and having outer edge means extending beyond said outlet opening means of said body means to restrict the flows of induced air between the flows of fuel issuing from said radiating portions of said outlet opening means.

**5,035,610**

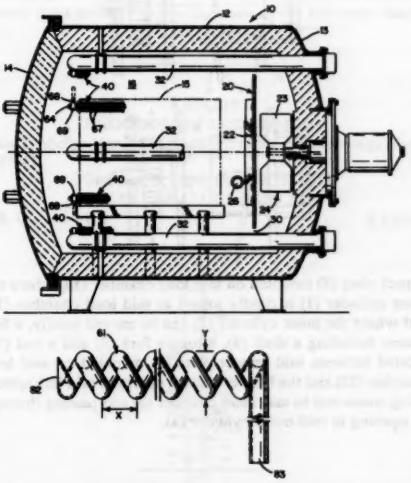
## INTERNAL HEAT EXCHANGE TUBES FOR INDUCTRIAL FURNACES

**Max Hoetzl, Toledo, Ohio, and Thomas M. Lingle, Temperance, Mich., assignors to Surface Combustion, Inc., Maumee, Ohio**

**Filed Jul. 23, 1990, Ser. No. 557,324**

**Int. Cl.[5] F27D *15/02***

**U.S. Cl. 432—77** **12 Claims**



1. Apparatus for cooling the work in an industrial furnace comprising:

at least one longitudinally-extending outer tube of predetermined diameter, said outer tube closed at one axial end while open at its opposite axial end and positioned within said furnace with its open end outside said furnace;

a second open ended, longitudinally-extending inner tube having an outside diameter smaller than the inside diameter of said outer tube and positioned to longitudinally extend within said outer tube; said inner tube bent over a longitudinally-extending portion thereof in the form of a helical coil and snugly fitting within said first tube; and

means for injecting a coolant into said inner tube at said inner tube's open end which is closest to said outer tube's open end for initially cooling said outer tube by said inner tube and finally cooling said outer tube by said coolant when said coolant exits said inner tube's open end closest said closed end of said outer tube and returns to said open end whereby thermal distortion of said outer tube is minimized.

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**5,035,611**

## APPARATUS FOR CONTROLLING GAS FLOWS IN VACUUM FURNACES

**Karlheinz Neubecker, Kleinostheim; Cordt Rohde, Hanau, and Gerhard Welzig, Darmstadt, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany**

**Filed Mar. 29, 1990, Ser. No. 501,103**

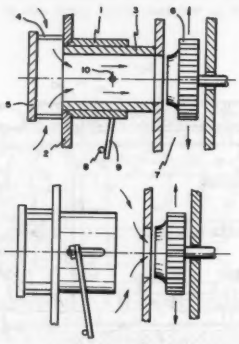
**Claims priority, application Fed. Rep. of Germany, Mar. 30, 1989, 3910234**

**Int. Cl.[5] F27B *3/22***

**U.S. Cl. 432—176** **1 Claim**

1. Apparatus for controlling gas flows in vacuum furnaces

wherein the loads are both heated and chilled in a load chamber by means of a gas-recirculating blower, comprising a furnace receptacle (11), a load chamber (13) located within said receptacle, and a blower (6) arranged on the center axis of said receptacle (11) and having a suction aperture, two relatively displaceable cylinders (1, 3) mounted between the load chamber (13) and the blower (6) on the center axis of the furnace, an



impact plate (5) mounted on said load chamber (13) where the outer cylinder (1) is rigidly joined to said load chamber (13) and where the inner cylinder (3) can be moved axially, a link system including a shaft (8), a toggle fork (9) and a rod (10) located between said impact plate (5) mounted on said load chamber (13) and the blower suction aperture, said link system being connected to said inner cylinder (3) and passing through an opening in said outer cylinder (1).

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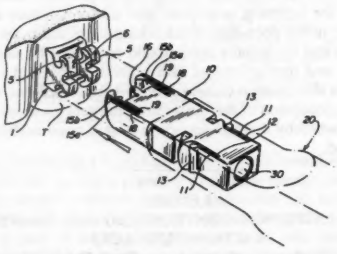
**5,035,612**

## DEBONDING TIP FOR ELECTROTHERMAL DENTAL BRACKET REMOVAL

**Patrick Martin, La Costa, and Richard L. McMillan, San Diego, both of Calif., assignors to Johnson & Johnson Consumer Products, Inc., New Brunswick, N.J.**

**Filed May 2, 1990, Ser. No. 518,059**
**Int. Cl.[5] A61C *3/00***
**U.S. Cl. 433—3** **10 Claims**



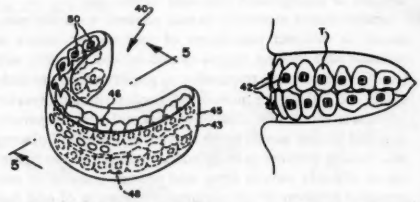
1. A heating element comprising a debonding tip for electrothermally debonding a dental bracket adhesively attached to a tooth, said bonding tip conforming to the surface of the dental bracket in a mating relationship with said bracket surface and further including prongs attachable around the tie wings of a dental bracket and wherein said prongs each comprise a leaf spring which fits on the mesio-distal sides of the bracket, and a rigid outer member against which said leaf spring is forced when placed on said bracket.

**5,035,613**

## ORTHODONTIC FINISHING POSITIONER AND METHOD OF CONSTRUCTION

**Peter R. Breads, Grand Island; Gerard P. Abbatte, Buffalo, and Stephen P. Warunek, West Seneca, all of N.Y., assignors to Great Lakes Orthodontics, Ltd., Tonawanda, N.Y.**

**Continuation-in-part of Ser. No. 46,087, May 5, 1987, Pat. No. 4,856,991. This application Jul. 20, 1987, Ser. No. 75,327**
**The portion of the term of this patent subsequent to Aug. 15, 2006, has been disclaimed.**
**Int. Cl.[5] A61C *3/00***
**U.S. Cl. 433—6** **14 Claims**



1. An orthodontic appliance for malocclude teeth including a monolithic body of elastomer base material having an arcuate-shaped portion along which is defined a recess for receiving teeth of one dental arch of the patient wherein the teeth include malocclude teeth to which are secured coupling members, the recess having walls defining teeth-engaging surfaces shaped generally complementary to the surfaces of the teeth of said one arch when the malocclude teeth thereof are positioned in a predetermined orientation and defining a series of indentations formed in the material of said body and disposed across said teeth-engaging surfaces, each indentation shaped in the material of said body to nestingly accept a corresponding protruding coupling member portion when placed thereabout so that when said appliance body is operatively positioned within the patient's mouth and stretched about the teeth of the one dental arch so that the teeth thereof are accepted by the recess of said arcuate-shaped portion and each protruding coupling member portion is nestingly accepted by a corresponding indentation, the stretched body acts directly against the teeth and the coupling member portion to urge the teeth toward a desired orientation, the improvement characterized in that:

the elastomer base material is a silicone elastomer composition which, when in an uncured condition, is liquid and possesses a sufficiently low viscosity so that said positioner can be formed in a low pressure injection molding process, which composition is curable to a solid form by the application of heat so that the rate of cure can be controlled by controlling the amount of heat applied, and which, when in a cured condition, possesses a relatively high resistance to tear and an inherent strength for urging preselected ones of the teeth toward a predetermined orientation wherein the positioner forces for acting upon the teeth are within a range of orthodontically-acceptable force levels.

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**5,035,614**

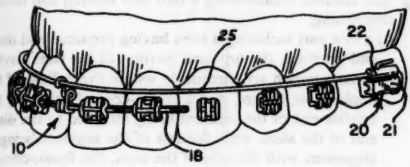
## INTRUDING AND TORQUING AUXILIARY

**Raphael L. Greenfield, Boca Raton, Fla., assignor to TP Orthodontics, Inc., Westville, Ind.**

**Filed Jan. 17, 1990, Ser. No. 466,516**
**Int. Cl.[5] A61C *3/00***
**U.S. Cl. 433—21** **10 Claims**

1. In combination with an edgewise bracket mounted on an anterior tooth and having a horizontally opening rectangular archwire slot and one or more tie wings, a rectangular archwire received in the archwire slot, and a secondary round archwire disposed gingival of the bracket and slidably received in buccal tubes mounted on molar teeth, an intruding and

torquing auxiliary comprising a first end and a second end, means for connecting said first end non-rotatively to the bracket, said second end extending gingival to the first end and means for connecting said second end to said secondary archwire, said secondary archwire being activated gingivally, and




a coil between the first and second ends, said auxiliary being of a resilient material and extending gingivally from said means for connecting said first end to said means for connecting said second end, whereby the auxiliary develops intrusive and torquing forces on the tooth.

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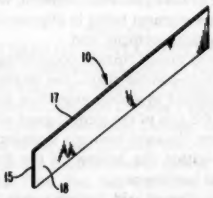
**5,035,615**

## DENTAL FILLING BAND AND METHOD OF USE

**Franklin Din, 33 State Rd., Princeton, N.J. 08540**

**Filed May 31, 1990, Ser. No. 531,299**
**Int. Cl.[5] A61C *5/04, 5/00***
**U.S. Cl. 433—39** **10 Claims**




1. A matrix band for use in composite restoration of a tooth, said matrix band being formed as a thin, elongated, flexible strip of material bondable to said tooth and said composite, wherein said band is formed of a mixture of light-activated material and a liquid resin.

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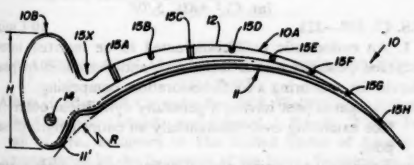
**5,035,616**

## DEVICE FOR SEPARATING THE PREMOLARS AND MOLARS

**Julian B. Woelfel, Columbus, Ohio, assignor to Girrbach Dental GmbH, Pforzheim, Fed. Rep. of Germany**

**Filed Nov. 30, 1989, Ser. No. 443,460**
**Claims priority, application Fed. Rep. of Germany, Nov. 30, 1988, 3840350135**
**Int. Cl.[5] A61C *19/04***
**U.S. Cl. 433—72** **21 Claims**




1. A device for separating the maxillary and mandibular premolars and molars of a dental patient while simultaneously fixing the two jaw joints in centric relation by supporting the maxillary and mandibular incisors by introducing the device between the maxillary and mandibular incisors, said device comprising a front member having a longitudinal dimension and a front end via which said front member is introduced between the maxillary and mandibular incisors, and said front member having a thickness dimension extending between the maxillary and mandibular incisors when said front member is introduced therebetween, said front member being curved in a plane containing the longitudinal and thickness dimensions and the thickness of said front member decreasing toward said front end, wherein said front member has an upper surface which extends along the longitudinal dimension and is located to contact the maxillary incisors when said front member is introduced between the maxillary and mandibular incisors, and said upper surface is provided with markings at uniform intervals along the longitudinal dimension indicating the thickness of said front member in the direction of the thickness dimension.

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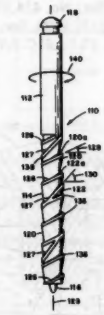
**5,035,617**

## ENDODONTIC INSTRUMENT

**John T. McSpadden, 6918 Shallowford Rd., Chattanooga, Tenn. 37421**

**Filed Jun. 5, 1990, Ser. No. 534,153**
**Int. Cl.[5] A61C *5/02*; A61G *5/02***
**U.S. Cl. 433—102** **8 Claims**




1. An endodontic instrument for use during obturation or extirpation of a root canal comprising:

a shank;

a working portion extending along at least a portion of the length of the shank and terminating at a tip end; and

flute means formed in said working portion defining two continuous helical flutes which spiral along the length of the working portion, each of said helical flutes having a shoulder which generally faces in the same direction along the length of the working portion as does the shoulder of the other flute and which has a helical angle which is different from the helical angle of the shoulder of the other flute.

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**5,035,618**

## INSTRUMENT FOR THE TREATMENT OF DENTAL ROOT-CANALS

**Larry Katz, Valley Stream, N.Y.; Michel Maillefer, and Pierre-Luc Maillefer, both of Ballaigues, Switzerland, assignors to Les Fils D'Auguste Maillefer, Societe Anonyme a Ballaigues, Switzerland**

**Filed Mar. 2, 1990, Ser. No. 487,586**
**Claims priority, application Switzerland, Mar. 21, 1989, 1.029/89**
**Int. Cl.[5] A61C *5/02***
**U.S. Cl. 433—102** **11 Claims**

1. An instrument for the treatment of dental canals, said instrument comprising a tapered stem, and a layer of anti-fric-

tion material by which an outer end of said stem is coated, the end of said stem including an annular recess the depth of which

corresponds to the thickness of said layer and which is occupied by said layer.

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**5,035,619**

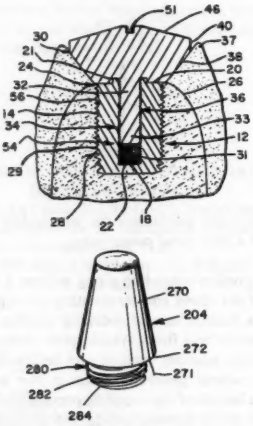
## ANATOMICAL RESTORATION DENTAL IMPLANT SYSTEM WITH IMPROVED HEALING CAP AND ABUTMENT

**Fereidoun Daftary, 50 N. La Cienega Blvd., #206, Beverly Hills, Calif. 90211**

**Continuation-in-part of Ser. No. 424,901, Oct. 20, 1989. This application Sep. 5, 1990, Ser. No. 577,923**

**Int. Cl.[5] A61C** *8/00*

**U.S. Cl. 433—173** **17 Claims**




1. A dental implant system implantable in the gingival tissue and the alveolus of the jaw bone comprising:

a. an implantable fixture having proximal and distal end portions, the proximal end portion having means for being embedded in opened gingival tissue and the alveolus of the jaw bone, the distal end portion being accessible from the outer surface of the jaw bone, the fixture being made of a substance permitting healing of the opened gingival tissue and growth of the jaw bone about the fixture, the fixture further including a hollow extending from an opening in the distal end portion towards the proximal end portion, the hollow having threads along at least a portion of its length;

b. means for sealing the hollow portion of the fixture during a period after implantation in which the jaw bone is growing about the proximal portion of the fixture;

c. means for providing a predetermined contour to the gingival tissue adjacent the distal end of the fixture, such that the gingival tissue re-heals in a contour reverse to that of the contour of said means;

d. a tooth analogue;

e. abutment means for supporting the tooth analogue;

f. means for releasibly attaching the tooth analogue to the abutment means;

g. said contour means being a two part healing cap further comprising,

(i) a first part including a stem having proximal and distal end portions, the proximal portion of the stem having threads which are threadable within the hollow of the implantable fixture, and a frusto-conical segment, the smaller end of the segment being attached to the distal end of the stem, with the axis of the segment being in alignment with the axis of the stem, the frusto-conical segment further including a hollow extending from an opening in the larger end of the segment toward the smaller end of the segment, the hollow having threads along at least a portion of its length,

(ii) a second part including a cylindrical segment having proximal and distal ends, the proximal end having a stem extending transversely to the proximal end, the axis of the stem aligned with the axis of the cylindrical segment, the stem having a threaded surface which is threadable within the hollow of the frusto-conical segment, and a screw head segment having a proximal end and a driven end, the driven end cooperable with a driving tool, the proximal end being attached to the distal end of the cylindrical segment, with the axis of the screw head segment being in alignment with the axis of the cylindrical segment; and

h. said abutment means further comprising a head segment having a frusto-conical shape, the larger end of the head segment attached to a stem extending transversely to the larger end, the axis of the stem aligned with the axis of the head segment, the stem having a threaded surface which is threadable within the hollow of the frusto-conical segment of said healing cap;

i. whereby the stem of said healing cap is threaded into the hollow of said fixture and the gingival tissue re-heals in a contour reverse to that of the contour of the frusto-conical portion of the healing cap, and thereafter the second part of the healing cap is unscrewed from the first part of the healing cap and the stem of said abutment means is screwed into the frusto-conical portion of the healing cap and the tooth analogue is attached to the abutment means.

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**5,035,620**

## ENDODONTIC POST WITH SPIRAL GROOVE

**James B. Roane, 707 SW. 24th St., Ste. 201, Norman, Okla. 73069**

**Filed Feb. 9, 1989, Ser. No. 308,046**

**Int. Cl.[5] A61C** *5/08*

**U.S. Cl. 433—221** **10 Claims**

1. An endodontic post constructed to be inserted into a prepared post space in a tooth root and cemented in place therein for anchoring a tooth restoration, comprising:

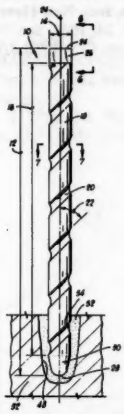
an elongated post having a generally cylindrical outer surface extending over substantially an entire length of said post;

one and only one spiral groove defined in said outer surface of said post, said groove having a pitch angle in a range of from about 35° to about 55° so that said groove provides:

a vent means for venting air and/or cement as said post is placed in said prepared post space;

a retention means for aiding retention of said post when said post is cemented in said prepared post space; and

a thread means for threading said post out of said prepared post space in the event of removal of said post; and



wherein an ungrooved area of said cylindrical outer surface of said post is substantially greater than a grooved area of said cylindrical outer surface.

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**5,035,621**

## METHOD OF DENTAL TREATMENT

**Peter Gottschalk, Centerville; Douglas C. Neckers, Perrysburg, both of Ohio; Gary B. Schuster, Champaign, Ill.; Paul C. Adair, Springboro, Ohio, and S. Peter Pappas, Fargo, N. Dak., assignors to Mead Corporation, Dayton, Ohio**

**Continuation of Ser. No. 281,303, Dec. 7, 1988, Pat. No. 4,937,159, which is a continuation-in-part of Ser. No. 180,915, Apr. 13, 1988, Pat. No. 4,977,511, which is a continuation-in-part of Ser. No. 944,305, Dec. 18, 1986, Pat. No. 4,772,530, which is a continuation-in-part of Ser. No. 860,367, May 6, 1986, abandoned, which is a continuation-in-part of Ser. No. 800,014, Nov. 20, 1985, abandoned. This application Jun. 28, 1990, Ser. No. 546,169**

**Int. Cl.[5] A61C** *5/04*

**U.S. Cl. 433—226** **6 Claims**

1. A method of dental treatment comprising the steps of:

cleansing the dental surface to be repaired;

applying a photopolymerizable composition to the dental surface comprising an acrylate based adhesive material, and a photoinitiator, wherein said photoinitiator comprises an ionic dye-counter ion compound capable of absorbing actinic radiation and producing free radicals which initiate free radical polymerization of said acrylate based adhesive material;

exposing the dental surface to actinic radiation to initiate photopolymerization; and

curing said adhesive material.

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**5,035,622**

## MACHINE GUN AND MINOR CALIBER WEAPONS TRAINER

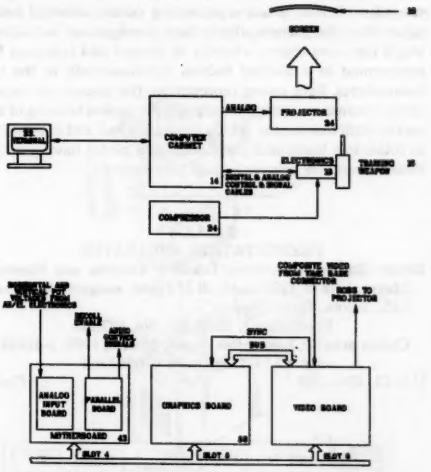
**Albert H. Marshall, Orlando; Ronald S. Wolff, Cocoa; Robert T. McCormack, Orlando, and Edward J. Purvis, Winter Park, all of Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Nov. 29, 1989, Ser. No. 445,803**

**Int. Cl.[5] F41G** *3/26*

**U.S. Cl. 434—23** **7 Claims**

1. A minor caliber weapons trainer comprising: a screen for displaying target and shot images; projector means for projecting a pre-recorded target image onto the screen; shot simulator means for providing said shot image, having means for projecting shot in-flight and impact images on the screen, and a simulated minor caliber weapon having elevation sensing means for providing elevation data of said minor caliber weapon, and actuable trigger means for providing a signal to generate trajectory data upon actuation of said trigger means; and computer mean coupled to said shot simulator means and said




projector means for identifying a preselected range and location within the target image, computing the trajectory data and impact location for said shot image in accordance with a ballistic equation and said elevation data in response to said signal from said trigger means, and comparing said preselected range and location with said trajectory data and impact location to identify hits.

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**5,035,623**

## PLANETARIUM

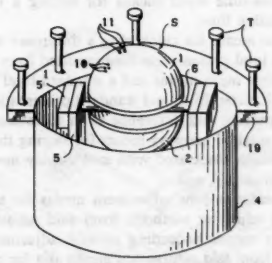
**Pierre Coudurier, 27, rue Balay, 42 000 Saint-Etienne; Pierre Boutte, Fraisses; Patrick Romeuf, Sorbiers; Paul Tronchon, Chozeau, and Michel Auffranc, Dargoire, all of France, assignors to Groupement Pour L'Automatisation de la Production Gap and Pierre Coudurier, both of Saint Etienne, France**

**Continuation of Ser. No. 277,124, Nov. 29, 1988, abandoned. This application Jun. 14, 1990, Ser. No. 539,318**

**Claims priority, application France, Dec. 3, 1987, 87 17359**

**Int. Cl.[5] G09B** *27/00*

**U.S. Cl. 434—286** **9 Claims**



1. A planetarium comprising a base support, a protective housing and a carrier structure means, a sphere constituting two hollow hemispheres having diametric planes being op-

posed and facing one another, said hemispheres having integration means with one another in the central part of their diametric planes by a first support means, thereby assuring their connection, said support means including a link means located between the two hollow hemispheres thereby assuring a fixation function in relation to a carrier structure means, said hollow hemispheres being rotatable themselves relative to said second support means, said hollow hemispheres being arranged with lens means representing certain celestial bodies other than the planets, the hollow hemispheres including a single luminous source whereby to project said luminous flux represented in a divided fashion simultaneously in the two hemispheres, light means representing the planets are located on an external ring integral with said protective housing of said carrier structure means, which ring is adapted and constructed to rotate in a horizontal plane, said light means having optical means orientable relative to said base support.

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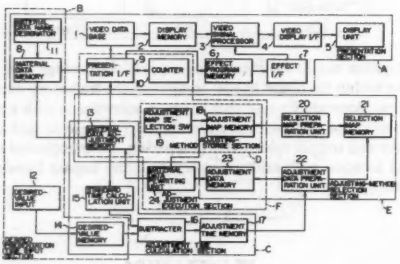
**5,035,624**

## PRESENTATION APPARATUS

**Rituko Hosoya, Kamakura; Takahiro Yamada, and Masataka Musya, both of Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Mar. 2, 1990, Ser. No. 487,126**
**Claims priority, application Japan, Mar. 6, 1989, 1-51929**
**Int. Cl.[5] G11B *27/00*; G09B *5/00***
**U.S. Cl. 434—309** **17 Claims**



1. A presentation apparatus comprising:

video storage means for storing therein a plurality of video materials;

an adjustment memory for storing therein at least a reading-out order of said video materials from said video storage means, standard presentation times of the video materials, and display methods;

presentation means for sequentially reading out the video materials from said video storage means according to the data of said adjustment memory for screening;

presentation-time input means for setting a desired total presentation time;

subtraction means for calculating a difference between said desired total presentation time inputted from said presentation-time input means and a standard total presentation time calculated from said standard presentation times and for outputting said difference as an adjustment time;

adjusting-method memory means for storing therein adjusting methods associated with said display methods of the video materials; and

total-presentation-time adjustment means for selecting one of said adjusting methods from said adjusting method memory means according to said adjustment time received from said subtraction means and for rewriting the data of said adjustment memory to set said total presentation time to be equal to or smaller than said desired total presentation time.

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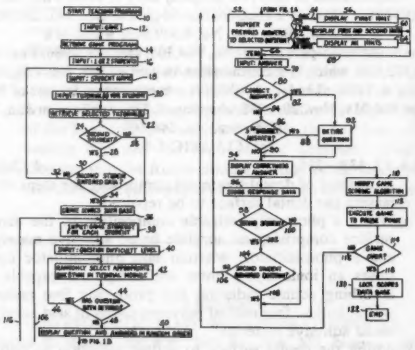
**5,035,625**

## COMPUTER GAME TEACHING METHOD AND SYSTEM

**Gerald L. Munson, Madison; Edward P. Daniels, Jr., and Joseph D. Mallozzi, both of Trumbull, all of Conn., assignors to Munson Electronics, Inc., New Haven, Conn.**

**Filed Jul. 24, 1989, Ser. No. 384,488**
**Int. Cl.[5] G09B *3/00***
**U.S. Cl. 434—332** **24 Claims**



1. A method of teaching a student comprising:

executing a game program by a computer until a game flow pause point is reached and generating a game score according to a game scoring algorithm as a result of game input by the student from an input means;

selecting a question from a tutorial module containing educational information and a plurality of questions and answers pertaining thereto;

displaying the selected question to the student on a display means;

accepting a student response to the displayed question from the input means;

storing the student response in a scores database of student response data;

modifying the game scoring algorithm as a result of correct student responses such that better game scores will more likely be generated in response to game input by the stu-

dent, said game input not being in response to said questions; and

displaying the game score to the student to encourage the student.

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**5,035,626**

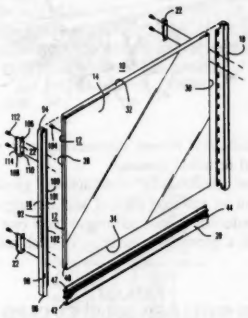
## MARKERBOARD

**Brian J. Persing, Northgate, Mich., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Jun. 1, 1990, Ser. No. 531,994**

**Int. Cl.[5] G09B** *19/00*

**U.S. Cl. 434—408** **6 Claims**



1. A markerboard comprising:

a substantially rectangular support substrate having front and back major opposed sides, first and second longitudinal ends, a top edge and a bottom edge,

erasable means on at least the front side of said support substrate having an erasable surface,

an elongated rail depending from the bottom edge of the support substrate,

said elongated rail having a front surface which is substantially co-planar with the erasable surface of the erasable means, first and second ends adjacent to the first and second longitudinal ends of the support substrate, and a lower edge,

said elongated rail defining a cavity and an elongated slot in the front surface which extends between the first and second ends and which communicates with the cavity,

said elongated slot having upper and lower edges, with the lower edge being defined by an upstanding accessory support lip,

and first and second elongated stiles fixed to the first and second ends of the substrate, with said first and second elongated stiles extending from the top of the support surface to the lower edge of the elongated rail.

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**5,035,627**

## ELECTRONICS INTERCONNECTION MECHANISM

**Carl M. Burnett, and Karl H. Wester, both of Melbourne, Fla., assignors to Storage Technology Corporation, Louisville, Colo.**

**Filed Aug. 9, 1990, Ser. No. 565,051**

**Int. Cl.[5] H01R** *13/629*

**U.S. Cl. 439—64** **7 Claims**

1. An apparatus adapted to provide electrical interconnections between a first electronic device having a housing and plurality of external electrical connectors, and a second electronic device having a housing an electrical connector mounted on said housing, said apparatus comprising:

an interconnection assembly having:

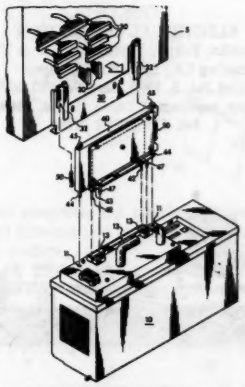
(a) an edge;

(b) a plurality of first electrical connectors adapted to mate with a corresponding number of said electrical connectors of said first device;

(c) a second electrical connector extending along a portion of said edge adapted to mate with said electrical connector of said second device; and

(d) a predefined set of electrical connections between said first electrical connectors and said second electrical connector;

a bracket assembly attached to said housing of said first device having a plurality of tracks adapted to receive said interconnection assembly and permit movement of said interconnection assembly along a predetermined axis with respect to said first housing to permit said second connector of said



interconnection assembly to mate with said electrical connector of said second device, and further having an opening adapted to permit said electrical connectors of said first device to pass through said bracket assembly and be connected to said first connectors of said interconnection assembly; and

spring means connecting said interconnection assembly with said bracket assembly, adapted to provide a biasing force tending to separate said second connector of said interconnection assembly from said connector of said second device.

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**5,035,628**

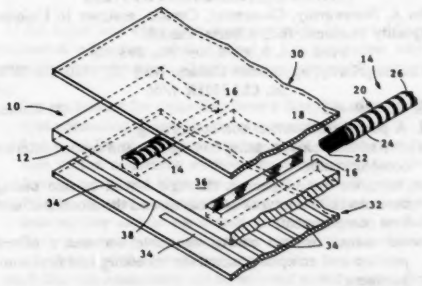
## ELECTRICAL CONNECTOR FOR ELECTRICALLY INTERCONNECTING TWO PARALLEL SURFACES

**Albert Casciotti, Hershey, Pa.; Ronald A. Dery, Winston-Salem, N.C., and Richard H. Zimmerman, Bradenton, Fla., assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed May 29, 1990, Ser. No. 530,042**

**Int. Cl.[5] H01R** *9/09*

**U.S. Cl. 439—66** **9 Claims**



1. An electrical connector for being positioned between and

for electrically interconnecting conductive areas on two spaced apart parallel surfaces, said connector comprising:

a housing having a slot open on opposing surfaces,

retaining means for retaining a contact element in said slot,

a cylindrical contact element comprising a flexible circuit-carrying film wrapped around a canted coil spring with said circuits facing outwardly, said contact element being disposed in said slot with portions thereof extending outwardly from said opposing surfaces for electrically engaging and thereby electrically interconnecting conductive areas on the two parallel surfaces.

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**5,035,629**

## ELECTRICAL CONNECTOR

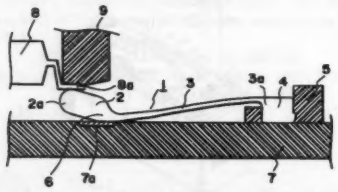
**Noriyuki Matsuoka, Tokyo, Japan, assignor to Yamaichi Electric Manufacturing Co., Ltd., Tokyo, Japan**

**Filed Jul. 3, 1990, Ser. No. 547,999**

**Claims priority, application Japan, Jul. 4, 1989, 1-172691**

**Int. Cl.[5] H01R 9/09**

**U.S. Cl. 439—70** **4 Claims**




1. An electrical connector comprising a board having an electrically conductive member thereon, a connector base fixed to said board, and an electrically conductive contact fixed relative to said board by said connector base,

said contact including a contact nose, and a resilient supporting element extending contiguously from said contact nose with a predetermined angle defined therebetween such that a bent portion of the contact is formed between the contact nose and the supporting element,

said contact nose being resiliently displaceable about the bent portion, said bent portion being disposed over the electrically conductive member of said board, and said resilient supporting element having a tail end remote from said bent portion and which tail end is fixed from moving relative to said board by said connector base,

whereby when a sufficient downward force is exerted on said contact nose, said resilient supporting element is flexed and said contact nose is resiliently displaced about said bent portion with said bent portion contacting the electrically conductive member of said board under pressure.

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**5,035,630**

## POWER DISTRIBUTION SYSTEM

**John A. Norsworthy, Gloucester, Canada, assignor to Unique-Quality Products, Inc., Alberta, Canada**

**Filed Oct. 9, 1990, Ser. No. 593,965**

**Claims priority, application Canada, May 28, 1990, 2017673**

**Int. Cl.[5] H01R 4/66**

**U.S. Cl. 439—92** **20 Claims**

1. A power distribution box comprising:

a substantially closed casing having first and second interior compartments;

at least one input opening, through a wall of said casing between the exterior of said casing and the interior of said first compartment;

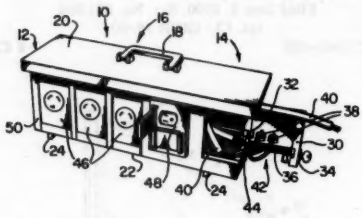
cover means on said casing moveable between a closed position and an open position for accessing said first compartment;

first terminal means within said first compartment for receiving an electrical power cable inserted through said input opening;

second terminal means within said first compartment;

electrical conductor means between said first and second terminals;

at least one electrical receptacle having plural contacts and mounted through a side wall of said second compartment for receiving a connector of an external power load cable;




electrical conductor means connecting said receptacle to said second terminal means;

at least one electrically conducting grounding stake mounted on an exterior wall of said casing; and

electrical conductor means joining at least one said grounding stake to a grounding terminal of each said receptacle.

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**5,035,631**

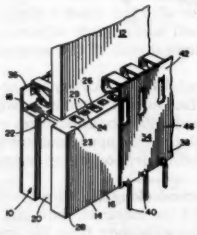
## GROUND SHIELDED BI-LEVEL CARD EDGE CONNECTOR

**Heinz Piorunneck, Trumbull; Rocco J. Noschese, Wilton, both of Conn., and Fernando J. Ramirez, Fountain Valley, Calif., assignors to Burndy Corporation, Norwalk, Conn.**

**Filed Jun. 1, 1990, Ser. No. 532,300**

**Int. Cl.[5] H01R 4/66**

**U.S. Cl. 439—108** **28 Claims**




1. An electrical connector for mechanically and electrically connecting a mother printed circuit board and a removable daughter printed circuit board of the edge card type, the connector comprising:

a housing being comprised of an electrically insulating material and having a top surface with a slot for receiving a portion of a daughter printed circuit board and at least two rows of contact chambers on opposite sides of said slot;

a plurality of a first type of electrically conductive contacts positioned in at least some of said contact chambers;

a plurality of a second type of electrically conductive contacts positioned in at least some of said contact chambers; and

a ground shield positioned along an exterior surface of said housing comprising an electrically conductive plate with solder tails extending from a bottom portion of said plate for coupling with a mother printed circuit board, at least one finger portion extending into said housing, each finger portion being located in an area between two of said first type of contacts in one of said rows, and a top portion

extending above said housing top surface for connection to grounding portions on a daughter printed circuit board such that electricity from daughter printed circuit board ground portions can be transmitted to a mother printed circuit board along relatively short paths and, electromagnetic forces generated by electricity flowing through said first type of contacts can be, at least partially, intercepted by said ground shield finger portions and transmitted to a ground in a mother printed circuit board.

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**5,035,632**

## CARD CONNECTOR WITH INTERCEPTOR PLATE

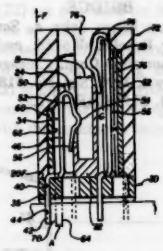
**Edward Rudoy, Woodland Hills, and Michael A. Lin, Anaheim, both of Calif., assignors to ITT Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 419,405, Oct. 10, 1989, Pat. No. 4,950,172. This application May 18, 1990, Ser. No. 525,936**

**The portion of the term of this patent subsequent to Aug. 21, 2007, has been disclaimed.**

**Int. Cl.[5] H01R *13/648***

**U.S. Cl. 439—108** **12 Claims**



10. A connector comprising:

insulative support means;

a row of contacts with each contact including a mounted part in said support means and an elongated leg extending primarily in a predetermined forward direction from said mounted part, with the legs of the contacts in said row lying substantially in an imaginary plane;

an interception plate of electrically conductive material lying in a plane extending parallel to said imaginary plane of said row, said interception plate lying closer to the contacts of said row of contacts than the distance between said contacts in said row, and said interception plate having at least a portion adjacent to a plurality of said contacts and at a predetermined potential; and

the space between each said contact leg and said adjacent interception plate being substantially devoid of insulation.

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**5,035,633**

## DATA-PROCESSING APPARATUS IN WHICH A CARD-SHAPED RECORDING MEDIUM IS USED

**Hiromichi Kobayashi, Yokohama, and Fumio Izawa, Sagamihara, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Feb. 23, 1990, Ser. No. 483,941**

**Claims priority, application Japan, Feb. 23, 1989, 1-43499**

**Int. Cl.[5] H01R *13/44***

**U.S. Cl. 439—140** **9 Claims**

1. A data-processing apparatus comprising:

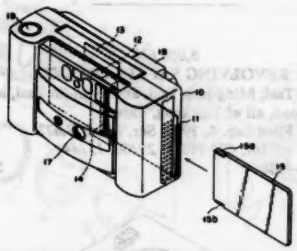
a card-shaped recording medium containing at least one semi-conductor memory and having a connector at one end;

a housing;

data-processing means located in said housing, for processing data, said data-processing means adapted for at least one of receiving data from said semiconductor memory and supplying the processed data to said semiconductor memory;

a connector unit incorporated in said housing and having connection pins for connecting said connector of said recording medium to said data-processing means when said recording medium is connected to said data-processing means;

a pin-protecting member movable between a first position where said pin-protecting member opposes said pins and prevents anything other than said card-shaped recording medium from contacting said pins, and a second position



where said pin-protecting member allows an electrical connection between said pins and said connector of said recording medium; and

lock means for holding said pin-protecting member in the first position while sadi recording medium remains disconnected from said connector unit, and for allowing said pin-protecting member to move to the second position when said recording medium is connected to said connector unit.

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**5,035,634**

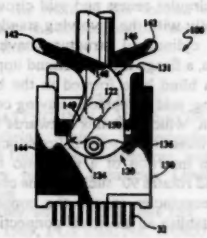
## CONNECTOR INJECT AND EJECT CAM LEVER ASSEMBLY

**Alexander W. Hasircoglu, Lancaster, and David T. Humphrey, Mechanicsburg, both of Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation of Ser. No. 545,046, Jun. 28, 1990, abandoned. This application Oct. 31, 1990, Ser. No. 606,374**

**Int. Cl.[5] H01R *13/62***

**U.S. Cl. 439—157** **17 Claims**



1. An inject and eject cam lever assembly for providing a mechanical advantage while forcing a first connector into a mated position with a second connector, the assembly comprising:

a first protrusion for extending from a first side of either the first connector or the second connector; and

a first lever for pivotably mounting about a pivot on a first side of the connector without the protrusion, the lever having a grip and a groove or slot for receiving the protrusion, the groove or slot having a mouth end, an inject cam surface and an eject cam surface, the cam surfaces having varying cam angles to control the mechanical advantage of the lever along its stroke,

such that the connectors can be injected to and ejected from the mated position by positioning the first connector adja-

cent the second connector substantially before the force is applied, positioning the lever with the protrusion in the mouth end, applying a force on the grip in a first direction camming the protrusion against the inject cam surface until the connectors are in the mated position, and applying a force on the grip in a second direction camming the protrusion against the eject cam surface until the protrusion is substantially in the first position.

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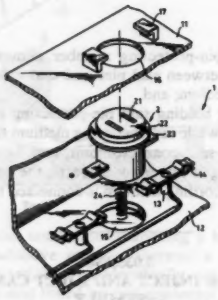
5,035,635

## REVOLVING SAFETY SOCKET

Shiang-shiun Tsai; Ming-jeng Tsai, and Mei-lin Tsai, all of 293 Pei Tun Road, all of Taichung, Taiwan

Filed Sep. 4, 1990, Ser. No. 578,873
Int. Cl.[5] H01R *29/00, 13/44*
U.S. Cl. 439—188 5 Claims



1. A revolving safety socket, either a wall type or a mobile type with an extension cord attached thereto, comprising:

a socket having a case body structure with a case cover and a case base; said case cover having a circular hole with two reversed L-shaped fasteners located oppositely thereby; said case base having a circular recess with two set columns formed thereby at opposite location; said set columns having electro-conductive copper clips attached thereto; said circular recess and said circular hole being located coaxially with the revolving stand; and a revolving stand of cylindrical structure having receptacles formed therein, a flange formed around upper end portion thereof, and a blind hole formed in the base thereof to receive a spring; said receptacles having conductive clips formed therein, which extends outwards horizontally in an opposite direction to form conductive members, whereby upon insertion of a plug into the socket, the revolving stand rotates 90° such that the conductive members of the receptacles engage the copper clips of the columns to establish an electrical connection.

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5,035,636

## DISC STACK CONNECTOR

Elmont E. Hollingsworth, Austin, Tex., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

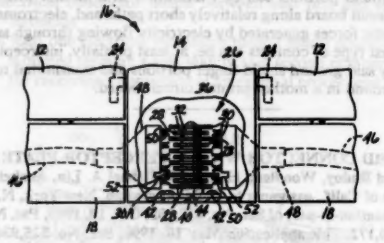
Filed May 3, 1990, Ser. No. 518,140
Int. Cl.[5] H01R *39/02*
U.S. Cl. 439—215 19 Claims

1. A device for providing multiple electrical connections, comprising:

a plurality of conductive disc members;

a plurality of insulative disc members interposed between said conductive disc members;

means for supporting said conductive and insulative disc members, thereby forming a disc stack; and



means for providing a clearance space on each side of said conductive disc members.

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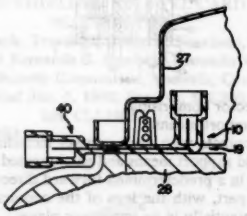
5,035,637

## ENGINE VALVE COVER GASKET WITH ELECTRICAL BRIDGE

Will W. Mathews, Glen Ellyn; John A. Serio, Addison, and James J. Grinsteiner, Roselle, all of Ill., assignors to Navistar International Transportation Corp., Chicago, Ill.

Filed May 4, 1990, Ser. No. 518,884
Int. Cl.[5] H01R *13/533*
U.S. Cl. 439—271 27 Claims



1. An engine valve cover gasket assembly, for use between a valve cover and a cylinder head of an engine, comprising a planar gasket body having an inner peripheral edge defining a closed periphery having electrically isolated electrical conductor means incorporated therein, electrically insulated first connection means disposed within said closed periphery operatively associated with said conductor means for establishing electrical connection thereof with an electrical device disposed within the valve cover, and electrically insulated second connection means for establishing electrical connection of said conductor means with an electrical control circuit for said device external an electrical control circuit for said device external of the valve cover.

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5,035,638

## ELECTRICAL TERMINAL WHICH HAS MEANS TO PROVIDE A RELIABLE ELECTRICAL CONNECTION

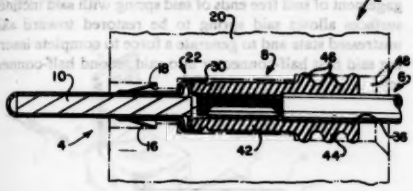
Friedrich A. J. Kourimsky, Bensheim, Fed. Rep. of Germany, assignor to AMP Incorporated, Harrisburg, Pa.

Filed Aug. 16, 1990, Ser. No. 568,005
Int. Cl.[5] H01R *4/70*
U.S. Cl. 439—275 9 Claims

1. An electrical terminal assembly (2) for use in the termination of an electrical conductor (6), the electrical terminal assembly (2) having a first end and an opposed second end, a mating portion (10) of the terminal assembly (2) is positioned proximate the first end of the terminal assembly, and a conductor engaging portion (26) is provided proximate the second end of the terminal assembly (2), the conductor engaging portion (26) having a conductor crimping means (34) which cooperates with the conductor (6) to provide the electrical interconnec-

tion between the conductor (6) and the terminal assembly (2), the electrical terminal assembly (2) being characterized in that:

insulating cover means (8) are provided which extend over the conductor engaging portion (26), the insulating cover means (8) having an opening (36) provided therein which allows the electrical conductor (6) and conductor crimping means (34) to be positioned in the opening (36), such that moisture condensation is prevented on the electrical conductor (6) and the conductor crimping means (34);




securing means (22) are provided on the electrical terminal assembly (2), the securing means have clamp arms which are movable between a first position and a second position, the second position having free ends (30) of the clamp arms (22) in cooperation with the insulating cover means (8) to maintain the insulating cover means (8) in cooperation with the conductor crimping means (34).

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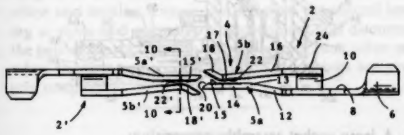
**5,035,639**

## HERMAPHRODITIC ELECTRICAL CONNECTOR

**Jerry B. Kilpatrick, Greensboro, N.C., and Clifford F. Lincoln, Atlanta, Ga., assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed Mar. 20, 1990, Ser. No. 496,471**
**Int. Cl.[5] H01R *25/00***
**U.S. Cl. 439—290** **7 Claims**




1. A hermaphroditic electrical terminal for interconnection to a like terminal, the terminal comprising a base portion having a bight portion integral therewith, the terminal having a first contact arm extending from the base portion and a second contact arm extending from the bight portion generally overlying the first contact arm, the terminal being characterized in that:

the first and second contact arms extend toward each other for a distance, where the first contact arm extends into a generally horizontal flat contact section, and the second contact arm continues toward the first contact arm to a position proximate a free end of the first contact arm, the second contact arm thereafter being bent away from the first contact arm, to form a radiused contact section proximate to the free end of the first contact arm,

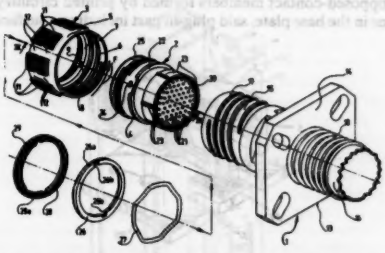
the first contact arm is coined along its longitudinal length to define a concave cross-section having the radius of curvature on the exterior of the first contact arm.

**5,035,640**

## ELECTRIC CONNECTOR

**Pierre L. M. Drogo, Le Verdier, 45570 Ouzouer sur Loire, France**

**Filed Feb. 2, 1990, Ser. No. 473,726**
**Claims priority, application France, Feb. 3, 1989, 89 01420**
**Int. Cl.[5] H01R *4/38***
**U.S. Cl. 439—321** **10 Claims**



1. An electric connector of the kind comprising a base flange, a plug, a lock mounted onto a plug body for making the plug fast with the base flange through screwing and connecting means between the plug body and the lock for braking the rotation of the lock in either direction with respect to the plug body and arranged so as to brake the rotation of the lock in the direction of unscrewing thereof with a force greater than the force for braking the lock in the direction of screwing of the latter, wherein the improvement consists in that the connecting means comprise two coaxial first and second wheels, mutually confronting side faces of which comprise teeth, each one with gently and steeply sloping faces, respectively, kept in meshing engagement with each other by the drawback force of a resilient biassing member, the second wheel being made fast with the lock body whereas the first wheel is held against rotation with respect to the plug body and is axially displaceable with respect thereto against the drawback force of the resilient biassing member, so that the rotation of the lock in the screwing direction would cause the gently sloping faces of the teeth of the second wheel to slip onto the corresponding gently sloping faces of the teeth of the first wheel and the rotation of the lock in the unscrewing direction would bring the steeply sloping faces of the teeth of the second wheel in abutting engagement against the corresponding steeply sloping faces of the teeth of the first wheel.

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**5,035,641**

## TERMINATING INSULATED CONDUCTORS

**Ronald Van-Santbrink, Muiden, Netherlands; John C. Collier, Southport, and David Lee, Goldbourne, both of United Kingdom, assignors to ITT Industries Limited, Basingstoke, United Kingdom**

**PCT No. Pct/GB89/00135, § 371 Date Dec. 15, 1989, § 102(e) Date Dec. 15, 1989, PCT Pub. No. WO89/07849, PCT Pub. Date Aug. 24, 1989**
**PCT Filed Feb. 13, 1989, Ser. No. 438,484**
**Claims priority, application United Kingdom, Feb. 15, 1988, 8803448; Netherlands, Mar. 18, 1988, 8800674**
**Int. Cl.[5] H01R *9/09***
**U.S. Cl. 439—329** **5 Claims**

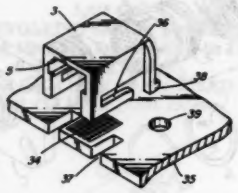
1. An electrical plug and socket connector for the connection of an external conductor to an electronic circuit installed on a planar base plate with printed circuitry, comprising:

a hollow, generally rectangular gutter-shaped housing, with a U-shaped cross section, for reception of an inserted plug-in part, said housing having an open side facing the printed circuitry on one side of the base plate, a plate-like closed side opposite said open side, and a pair of opposing sidewalls integral with and extending from said plate-like

closed side to form free ends directed toward the base plate;

means for fastening the free ends of said sidewalls to the baseplate to thereby close said open side of said housing, said means for fastening comprising projections, extending from the free ends of said sidewalls, fitted into apertures or slots situated in the base plate; and

a plug-in part with contact members installed thereon which extend from a side of the plug-in part to cooperate with opposed-contact members formed by printed circuitry on or in the base plate, said plug-in part including a surface on




the side thereof opposite the side from which said contact members extend; and

wherein the opposed-contact members are spaced from and bridged by said closed side of said housing in such a way that, with the introduction of the plug-in part into the housing, said plug-in part is inserted between said closed side of said housing and said opposed-contact members, and said surface of said plug-in part opposite said contact members cooperates with the inner surface of said plate-like closed side of said housing so that said contact members are brought into sliding contact with the opposed-contact members on the base plate.

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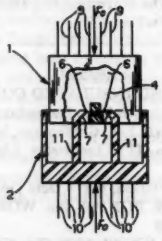
**5,035,642**

## AUTOMATICALLY-CONNECTING ELECTRICAL CONNECTOR

**Oreste Vittone, Moncalieri, and Matteo Picciriello, Torino, both of Italy, assignors to Fiat Auto S.p.A., Torino, Italy**

**Filed May 3, 1990, Ser. No. 518,612**
**Claims priority, application Italy, May 3, 1990, 6731 A/89**
**Int. Cl.[5] H01R *13/627***
**U.S. Cl. 439—350** **7 Claims**




1. An electrical connector for multiway connections in an electrical system of a motor vehicle comprising:

a first half-connector carrying male or female terminals of a first ribbon of cables and a second half-connector carrying female or male terminals of a second ribbon of cables, one of said half-connectors including a resilient device which stores energy during a first stage in connecting said half-connectors and which can return the stored energy to enable automatic connection of the first and second half-connectors during a subsequent second stage in connection said half-connectors, said resilient device for restoring energy comprising a substantially U-shaped spring having a pair of diverging free ends in the unstressed state, securing means in the first half-connector engaging the spring and securing said spring in said first half-connector with said spring disposed symmetrically with respect to a longitudinal axis of the connector, said second half-connector having a pair of spaced apart walls with oppositely inclined surfaces which are each inclined at an angle $\beta$ to the longitudinal axis of the connector, said walls having spaced apart free corners where the walls are closest which cause elastic deformation of the U-shaped spring as the spring passes between the corners during connecting of said half-connectors until said free ends of said spring pass the spaced apart corners of said walls, whereby engagement of said free ends of said spring with said inclined surfaces allows said spring to be restored toward said unstressed state and to generate a force to complete inserting said first half-connector into said second half-connector.

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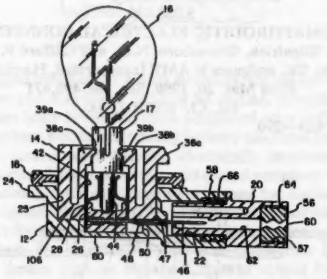
**5,035,643**

## AXIAL LOW PROFILE LAMP SOCKET ASSEMBLY

**John A. Forish, Fort Wayne, and John J. Rogers, Huntertown, both of Ind., assignors to Zanxx, Inc., Avilla, Ind.**

**Continuation-in-part of Ser. No. 352,965, May 17, 1989, Pat. No. 4,940,422. This application May 14, 1990, Ser. No. 523,018**
**The portion of the term of this patent subsequent to Jul. 10, 2007, has been disclaimed.**
**Int. Cl.[5] H01R *33/09***
**U.S. Cl. 439—358** **16 Claims**




1. A lamp socket assembly comprising:

a housing, said housing including a first cavity;

a body received in said first cavity, said body including a plurality of camming lugs for retaining said lamp socket assembly in a mounted position in an apertured panel, said body further including a through passage for receiving a lamp base therein and means for retaining said lamp base in said through passage;

a contact insert adapted to hold an electrical contact received in said first cavity, said contact insert including a groove for receiving said lamp base therein, said contact insert further including means for receiving and retaining an electrical contact;

an electrical contact retained in said contact insert for electrically engaging a terminal on said lamp base; and

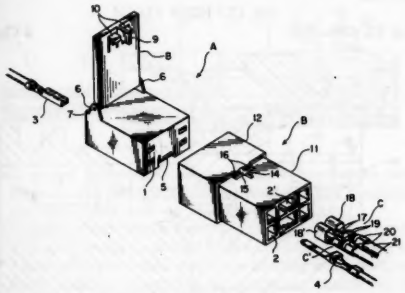
a terminal having a first end thereof interlocked with both said contact insert and contact and a second end thereof extending out of said housing in the axial direction of said through passage.

5,035,644

## PROPER COUPLING CONFIRMING MECHANISM FOR AN ELECTRIC CONNECTOR

Wataru Nakazato; Kunihiko Muraoka, both of Ohta; Shigemitsu Inaba, Shizuoka; Kazuto Ohtaka, Shizuoka, and Takashi Takagishi, Shizuoka, all of Japan, assignors to Yazaki Corporation and Fuji Jukogyo Kabushiki Kaisha, both of Tokyo, Japan

Filed Sep. 14, 1990, Ser. No. 582,729
Claims priority, application Japan, Sep. 22, 1989, 1-110328[U]
Int. Cl.[5] H01R *13/639, 29/00*
U.S. Cl. 439—372 3 Claims



1. A coupling confirming mechanism for an electric connector comprising a first connector housing and second connector housing, comprising:

first lock means provided between the first connector housing and the second connector housing for locking the first and second connector housings when assembled with each other;

second lock means including a locking lever which is pivotally attached to the first connector housing, for assuring the assembly of the first and second connector housings when said locking lever is pivoted onto said second connector housing;

a pair of short-circuiting terminals disposed in said second connector housing;

a normally closed contact formed between said pair of short-circuiting terminals; and

an insulating projection formed on the locking lever and adapted to extend within said second connector housing when said locking lever is pivoted onto the second housing to open said normally closed contact and disconnect the pair of short-circuiting terminals from each other only when the first and second connector housings are properly coupled.

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5,035,645

## BRACKET FOR TERMINAL BLOCK

John A. Siemon, Watertown, Conn., and Paul V De Luca, Plandome Manor, N.Y., assignors to The Siemon Company, Watertown, Conn.

Continuation-in-part of Ser. No. 330,678, Mar. 30, 1989, abandoned, which is a continuation-in-part of Ser. No. 144,040, Jan. 15, 1988, Pat. No. 4,824,403. This application Jul. 14, 1989, Ser. No. 380,123
Int. Cl.[5] H01R *9/22*
U.S. Cl. 439—532 24 Claims

1. A bracket for use with a terminal block, comprising:

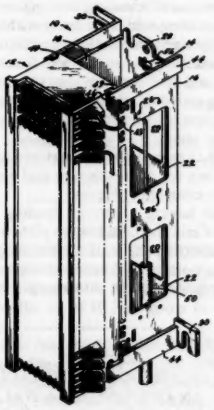
a pair of opposed side walls transverse to a rear wall; wherein each of said side walls comprises:

a longitudinally extending front surface;

a plurality of spaced apart wire guide openings along the front surface of at least one of the sidewalls;

a block support portion, said block support portion extending longitudinally along the rear wall from a first transverse edge to a second transverse edge, extending forwardly from the rear wall to a front surface, and having an inner lateral surface; and

a plurality of latch portions, each of said latch portions extending longitudinally from one of the transverse edges of the block support portion and integrally formed with a one edge, extending forwardly along the one edge from a rear surface to a front surface and having an inner lateral



surface wherein said inner lateral surface of the latch portion is stepped laterally outwardly from the inner lateral surface of the support portion; and

wherein the bracket further comprises:

latch means, extending forwardly from the front surface of each of the latch portions of the wall, for securing the block against the front surface of the block support portion.

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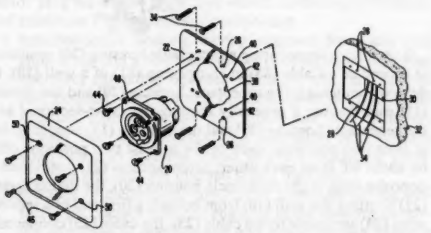
5,035,646

## FLUSH MOUNTED RECEPTACLE AND PLUG WITH PIN AND SLEEVE TYPE CONTACTS

Alfred L. Ehrenfels, Cheshire; David Lutz, North Branford, both of Conn., and Martin Parker, Ava, N.Y., assignors to Hubbell Incorporated, Orange, Conn.

Filed Jun. 29, 1990, Ser. No. 545,945
Int. Cl.[5] H01R *13/74*
U.S. Cl. 439—536 8 Claims



1. An improved pin and sleeve receptacle mountable in a wall box recessed in a wall opening of a building with wires extending into said box from an in-wall wiring passage, the receptacle comprising the combination of

a generally cylindrical, tubular shell of electrically non-conductive material having

an integrally formed closure at one end and with the other end being open,

a generally cylindrical inner surface having a first inner diameter, and

a flange extending radially outwardly from said open end of said shell adjacent said open end, said flange having fastener openings therethrough;

a cylindrical inner body having an outer diameter smaller than said first inner diameter, said inner body having electrically conductive female connector sleeves therein and openings at one end thereof for receiving electrically conductive pins of a mating connector;

means for mounting said inner body within said shell with a substantially uniform annular gap surrounding said inner body between the outer surface thereof and said inner surface of said shell for receiving the shroud of a pin-and-sleeve plug and with said openings at one end facing in the same direction as said open end of said shell to receive the pins of said plug;

means in said closure defining apertures for admitting wires from said box for connection to said electrically conductive female connector sleeves;

a cover plate having a central opening surrounding said open end of said shell, said cover plate having sloping side edges for abutting the wall surrounding said box; and

means for supporting said receptacle in said wall box and said cover plate against said receptacle flange and said wall.

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**5,035,647**

## DEVICE FOR SECURING A RECEPTACLE HOUSING IN AN OPENING OF A WALL

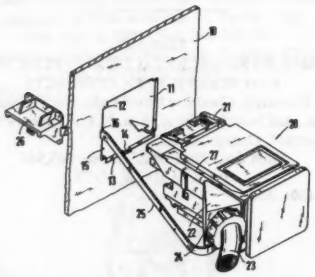
**Helmut Schafer, Kreuztal-Fellinghausen, Fed. Rep. of Germany, assignor to Rittal-Werk Rudolf Loh GmbH & Co. KG, Fed. Rep. of Germany**

**Filed Nov. 7, 1989, Ser. No. 432,682**

**Claims priority, application Fed. Rep. of Germany, Nov. 7, 1988, 8813917[U]**

**Int. Cl.[5] H01R** *13/627*

**U.S. Cl. 439—557** **8 Claims**



1. A device for securing a receptacle housing (20) positioned at an end of a Cable (23) in an opening (11) of a wall (10), the device comprising: the receptacle housing (20) and the opening (11) each having a generally rectangular cross-sectional area, the receptacle housing (20) and the opening (11) connectable in at least two positions, each of the at least two positions offset by about 90° from each other; detent springs (21) positioned on opposite sides of the receptacle housing (20), the detent springs (21) abutting the wall (10) from behind; a first end of a securing strap (25) securable to the cable (23), the cable (23) connectable with the receptacle housing (20), a second end of the securing strap (25) connectable to a cover (26); the cover (26) attachable on a contact side of the receptacle housing (20), the cover strap (25) disposable in a groove-shaped recess (14, 16 and 18), the groove-shaped recess (14, 16 and 18) located in the opening (11) for routing the securing strap (25) through the opening (11), the groove-shaped recess (14, 16 and 18) positioned in at least two side walls (13, 15 and 17) defining said opening (11); the side walls (13, 15 and 17) positioned at right angles with respect to each other, the securing strap (25) securable to the receptacle housing (20) by alignment of an incoming side of the cable (23) on the receptacle housing (20) with one of the at least two side walls (13, 15 and 17) having the groove-shaped recess (14, 16 and 18).

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**5,035,648**

## ELECTRICAL CONNECTOR HOUSING ASSEMBLY

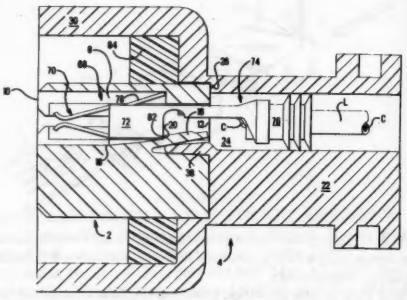
**David B. Kuiper-Moore, London, England, assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed Jul. 25, 1990, Ser. No. 558,027**

**Claims priority, application United Kingdom, Nov. 28, 1988, 8827756**

**Int. Cl.[5] H01R** *13/424*

**U.S. Cl. 439—595** **6 Claims**



1. An electrical connector housing assembly comprising, a first insulating housing (2) having a plurality of terminal receiving first through cavities (8) each opening into a front and a rear face (12,10) of the housing (2) and each being provided with an internal terminal locking lance (16); a second insulating housing (4) having a plurality of terminal access second through cavities (24) each opening into a front and a rear face (26,28) of the second housing (4), where each second cavity (24) is dimensioned to receive a sealing grommet (84) surrounding an electrical lead connected to the respective terminal (68); a terminal locking lance actuating member (38) projecting from the front face (26) of the second housing (4) proximate to each of the second cavities (24); and means (15,40) on the housings (2,4) for latching them together in a terminal loading position with the front faces (12,26) of the housings (2,4) spaced from each other and each first cavity (8) in alignment with a respective second cavity (24) to allow an electrical terminal (68) to be inserted into each first cavity (8) by way of the second cavity (24) aligned therewith, from the rear face (28) of the second housing (4), the latching means (15,40) permitting the housings (2,4) to be moved relatively towards each other from said loading position, so as to be latched in a terminal locking position in which the terminal locking lance actuating members (38) penetrate the first cavities (8) to actuate the internal terminal locking lances (16) therein positively to retain the terminals (68) in the first cavities (8).

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**5,035,649**

## SHIELDED ELECTRICAL CONNECTORS

**John C. Collier, Southport, and Stuart J. Reeves, St. Helens, both of United Kingdom, assignors to ITT Industries Limited, Basingstoke, United Kingdom**

**Filed Jan. 2, 1990, Ser. No. 459,913**

**Claims priority, application United Kingdom, Jan. 10, 1989, 8900450**

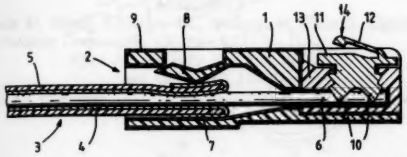
**Int. Cl.[5] H01R** *13/648*

**U.S. Cl. 439—607** **7 Claims**

1. A shielded electrical connector comprising: plug and socket connector components which may be mated by causing

the plug component to fit inside the socket component, said plug component having at least one resilient contact adapted to engage a relatively fixed contact carried by the socket component when the components are mated, each component having a conductive surface insulated from its corresponding contact, with said conductive surfaces lying adjacent to each other when the components are mated, and said conductive surfaces are pressed into engagement with each other by reaction to the force between said resilient and fixed contacts;.

said plug component being located on one end of a screened cable and said plug component having an external conductive layer forming one of said conductive surfaces and connected to the screen of the cable;




said socket component has an interior conductive layer forming one of said conductive surfaces and contacting the conductive layer on the plug component;

said socket component is formed jointly by a housing having a plug-receiving enclosure with a conductive surface and a printed circuit board which the housing is attached, said fixed contact comprising a conductive track on the printed circuit board which is exposed within the housing; and

a screening layer on the side of said printed circuit board remote from said conductive track, said housing having latches with metal surfaces which are pressed into engagement with said screening layer.

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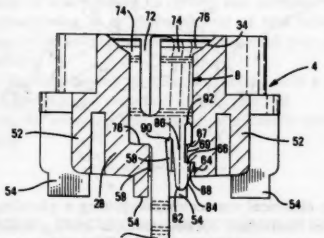
**5,035,650**

## ELECTRICAL CONNECTOR HAVING AN INNER METAL SHIELD

**George R. Defibaugh, Mechanicsburg, and Benjamin H. Mosser, III, Middletown, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed Jun. 15, 1990, Ser. No. 538,872**
**Int. Cl.[5] H01R *13/648***
**U.S. Cl. 439—609** **11 Claims**




1. A shielded electrical connector, comprising:

a dielectric housing having a longitudinal axis and defining a central block having a mating face and an opposite face extending transversely of said axis, a hood surrounding said central block in spaced relationship therewith and a base connecting the hood to said central block at a position remote from its mating face, the hood, the central block and said base, cooperating to define a chamber, said base defining a latching opening located between the central block and the hood and communicating with the chamber, a wall of the latching opening defining a first latching shoulder extending transversely of said axis and an abutment surface extending in the direction thereof and being adjacent to the latching shoulder, a plurality of terminal receiving cavities in the central block opening into the mating face thereof and into said opposite face, each for receiving an electrical terminal; and

a one piece, stamped and formed annular metal shield for reception in the chamber having an edge for engaging said base, a uniplanar latch arm for insertion into the latching opening having a stem extending from said edge and being stiffly and resiliently deflectable in its own plane, a head on the stem being provided with a cam surface for engagement with said abutment surface, as said latch arm is being initially inserted into the latching opening, to deflect the stem of the latch arm transversely of said axis in a first sense, a second latching shoulder extending from said cam surface transversely of the stem for engagement under said first latching shoulder upon said stem resiling in a second and opposite sense, when the second latching shoulder passes the first latching shoulder as the latch arm is inserted into said opening.

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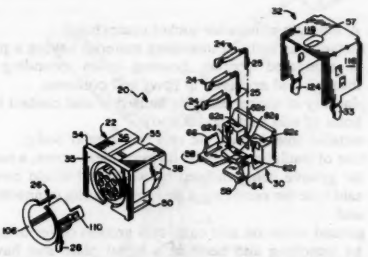
**5,035,651**

## MINIATURE CIRCULAR DIN CONNECTOR

**Daniel A. Dixon; Hsin Lee, both of Naperville; Henry Zielke, Hoffman Estates; Eugene J. Mysiak, Lisle, and David L. Brunker, Naperville, all of Ill., assignors to Molex Incorporated, Lisle, Ill.**

**Continuation of Ser. No. 440,570, Nov. 22, 1989, abandoned, which is a continuation-in-part of Ser. No. 310,979, Feb. 14, 1989, Pat. No. 4,894,026, which is a continuation-in-part of Ser. No. 275,818, Nov. 25, 1988, Pat. No. 4,913,664. This application Sep. 27, 1990, Ser. No. 590,448**
**The portion of the term of this patent subsequent to Jan. 16, 2007, has been disclaimed.**
**Int. Cl.[5] H01R *13/648***
**U.S. Cl. 439—609** **35 Claims**




1. A miniature DIN connector for mating with a DIN connector plug having a conductive shield extending thereabout, said miniature DIN connector comprising:

a nonconductive housing having opposed front and rear ends, a top and a bottom, a plurality of terminal-receiving apertures extending between the front and rear ends of said housing, said housing comprising an internal shield aperture extending into the front end and generally around said terminal-receiving apertures, said housing comprising an external shield aperture extending therethrough and into the internal shield aperture;

a plurality of electrically conductive terminals having pin-receiving contact portions engaged in the terminal-receiving apertures of said housing and board contact portions extending beyond the bottom of said housing;

an internal shield mounted in the internal shield aperture extending into the front end of said housing, said internal shield comprising contact means extending therefrom for electrical connection to a ground and comprising a slot generally aligned with the external shield aperture;

a base having an array of apertures extending therethrough for receiving the board contact portions of said terminals,

said base being mountable to the circuit board and comprising means for lockingly engaging the housing to the base; and

an external shield defining at least three external sides of said miniature DIN connector and comprising a first contact means for grounding said external shield, said external shield comprising a second contact means extending through the external shield aperture of the housing and through the slot of the internal shield for directly contacting the shield of a DIN connector plug when the plug is mated with the miniature DIN connector, said second contact means providing a low impedance electrical connection between the external shield and the shield of the mated DIN connector plug.

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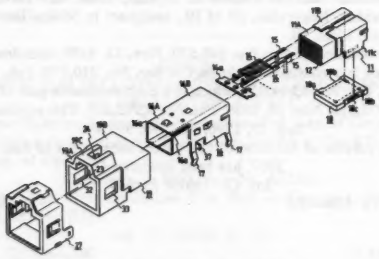
**5,035,652**

## MULTIPIN CONNECTOR SOCKET

**Yasuji Shibano, Izumisano, Japan, assignor to Hosiden Electronics Co., Ltd., Osaka, Japan**

**Filed May 11, 1990, Ser. No. 521,997**
**Claims priority, application Japan, May 22, 1989, 1-59222[U]**
**Int. Cl.[5] H01R *9/03***
**U.S. Cl. 439—610** **8 Claims**



1. A multipin connector socket comprising:

a rectangular body of insulating material having a plurality of elongated contact housing holes extending therethrough and arranged in rows and columns;

a plurality of socket contacts housed in said contact housing holes of said rectangular body;

a metallic shield cover on said rectangular body;

a case of insulating material on said shield cover, a rectangular groove being defined between said shield cover and said case for receiving a shell of a mating connector plug; and

a ground cover on said case, said ground cover being made by punching and bending a metal plate and having an opening in a front end thereof for receiving said mating connector plug, said ground cover including two side panels having slots therein for engagement with lugs set up from said shield cover, and a plurality of spring pieces formed integrally with said ground cover and extending into said rectangular groove.

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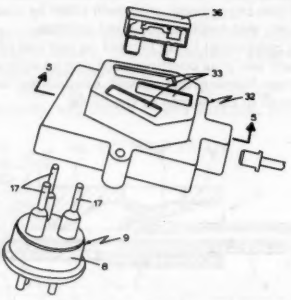
**5,035,653**

## TERMINAL BLOCK FOR A HERMETIC TERMINAL ASSEMBLY

**Glenn A. Honkomp, Warren; Eugene H. Tingley; Thomas O. McNay, both of Clermont, all of Ohio, and Benjamin Bowsky, St. Louis, Mo., assignors to Emerson Electric Co., St. Louis, Mo.**

**Filed Apr. 2, 1990, Ser. No. 503,232**
**Int. Cl.[5] H01R *13/68***
**U.S. Cl. 439—622** **9 Claims**

1. In combination with a hermetic terminal assembly having a body member sealed in a housing wall with protruding outer pin segment means sealed to said body member and extending from said body member externally of said housing wall, a current resistive terminal block, said terminal block including main channel means having aperture opening means on one face of said block sized to engagingly receive and protect said outer pin segment means within said main channel means and to act as a diffuser in the event of terminal assembly leakage, said main channel means having subchannel means communi-



catively extending therefrom sized to accommodate outside lead wire end connection means to be fastened to said outer pin segment means including fuse means in series with said lead wire end connection means whereby said fuse means is located in a position remote from said protected, outer pin segment means.

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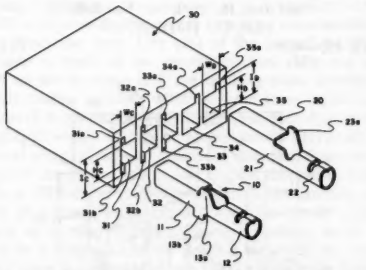
**5,035,654**

## ELECTRICAL CONNECTOR WITH SOCKET CONTACTS OF DIFFERENT SIZES HAVING MEANS FOR PREVENTING ERRONEOUS CONNECTION

**Hiroshi Endo, Tokyo, Japan, assignor to Japan Aviation Electronics Industry Limited, Japan**

**Filed Mar. 7, 1990, Ser. No. 489,704**
**Claims priority, application Japan, Mar. 8, 1989, 1-25507[U]**
**Int. Cl.[5] H01R *13/00***
**U.S. Cl. 439—679** **3 Claims**



1. An electrical connector comprising a plurality of separated and individual socket contacts having hollow active portions, at least two of said socket contacts being different from one another in a cross-sectional size for receiving plug contacts of different cross-sectional sizes, a particular one of said socket contacts having a large cross-sectional size of said hollow active portion , a specified one of said socket contacts having a small cross-section size of said hollow active portion , and an insulator housing having a plurality of conduits fixedly accommodating corresponding ones of said plurality of socket contacts, a particular one of said plurality of conduits accommodating said particular socket contact and having a large size for containing said large active portion, a specified one of said plurality of conduits accommodating said specified socket contact and having a small size for containing said small active portion, each of said socket contacts having at least one lateral

projection extending therefrom for serving as a stopper to prevent said specified socket contact from being accommodated in an incorrect one of said conduits, each of said conduits having at least one groove formed in said insulator housing, said groove extending in a lateral direction from each conduit and in a direction along each conduit, said at least one conduit accompanying each conduit receiving said at least one lateral projection of each socket contact accommodated in each conduit.

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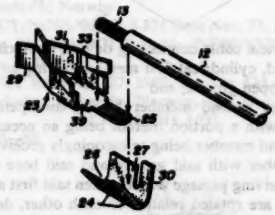
**5,035,655**

## LIGHT BULB RECEPTACLE AND METHOD OF ASSEMBLY

**Louis D. Hesse, Chicago, Ill., assignor to Phoenix Lighting Products Corporation, Chicago, Ill.**

**Filed Jul. 18, 1989, Ser. No. 382,537**
**Int. Cl.[5] H01R *17/00***
**U.S. Cl. 439—699** **9 Claims**



1. A bulb receptacle assembly for supporting a light bulb and maintaining electrical continuity between each terminal of said bulb and one end of each of a pair of electric source wire which includes:

(a) a pair of bulb contactors, each contactor comprising a heat treated spring steel channel member having two opposing upstanding spaced-apart sides connected by a panel there between and having one rearward edge of said panel contiguous with a first tab and an opposing forward edge contiguous with a second tab;

(b) a ductile metal strap wrapped around said wire end and said first tab;

(c) a generally tubular housing having a first opening on a first end of said housing to receive said terminal section, and an opening in an opposite end of said housing to receive both bulb contactors forming said pair of bulb contactors;

(d) said housing having an internal surface with a groove alignigly engaged with said second tab; and

(e) means for securing said contactor channels inside said housing.

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**5,035,656**

## CONNECTOR, CIRCUIT BOARD CONTACT ELEMENT AND RETENTION PORTION

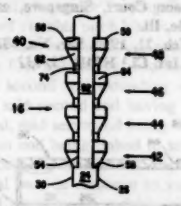
**Kanti D. Patel, Camp Hill, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed May 15, 1990, Ser. No. 523,565**
**Int. Cl.[5] H01R *13/42***
**U.S. Cl. 439—733** **22 Claims**

1. A retention portion of an electrical contact element for mechanical connection in a hole through a connector housing comprising:

a plurality of pairs of laterally opposed upsets of progressively different sizes along a longitudinal axis of the retention portion, each of the upsets comprising a pair of separate projections,

whereby when the element is inserted into the hole such that only the upsets come in contact with a wall of the hole when inserted therein, the upsets provide an incremental



interference with the hole during insertion while substantially preventing sliver formation.

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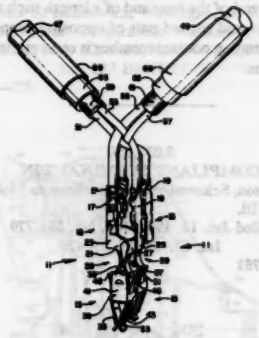
**5,035,657**

## ELECTRICAL CONNECTOR FOR A DATA BUS

**Jürgen Hass, Erzhausen, and Josef Woller, Griesheim, both of Fed. Rep. of Germany, assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed Jul. 9, 1990, Ser. No. 550,260**
**Claims priority, application Fed. Rep. of Germany, Jul. 10, 1989, 8908413[U]**
**Int. Cl.[5] H01R *13/432***
**U.S. Cl. 439—748** **13 Claims**

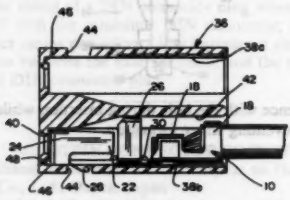


1. An electrical connector comprising at least one electrical contact element having at one end thereof a contact portion and being provided at the other end with a conductor terminating portion having at least two crimping portions for crimping termination of respective electrical conductors therein, the conductor terminating portion and the contact portion are connected to each other via a transition part having a transverse web which extends transversely to the longitudinal axis of the contact element,

the crimping portions extend parallel to each other and to the longitudinal axis of the contact element at locations of the transverse web that are spaced from each other in the direction of extension of the transverse web,

the two crimping portions extend from the two transverse ends of the transverse web and the two transverse ends are each bent by approximately 90° to the same side of the transverse web.

5,035,658
ELECTRICAL CONNECTOR AND TERMINAL THEREFOR
B. Alan Berg, Leedon Court, Singapore, assignor to Molex Incorporated, Lisle, Ill.
Filed Feb. 21, 1990, Ser. No. 483,476
Int. Cl.[5] H01R 13/432
U.S. Cl. 439—748 11 Claims

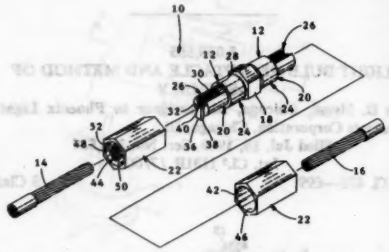



1. A terminal for an electrical connector, comprising:
elongated base having contact receptacle means at one end and conductor terminal means at the other end;
a first pair of opposing support sections extending upwardly from opposite lateral sides at said one end of the base for receiving therebetween a mating contact member into said receptacle means;
a second pair of opposing support sections extending upwardly from the base at a position intermediate the ends of the base; and
wherein the height of the first pair of opposing support sections is less than the height of the second pair of opposing support sections to facilitate insertion and removal of the terminal in a complementary cavity of an appropriate connector housing, the terminal further including a pair of resilient contact beams defining said receptacle means, the beams having distal ends pointing in a direction toward said other end of the base and of a length such that they do not contact said second pair of opposing support sections when the mating contact member is received in said receptacle means.

5,035,659
COMPLIANT TERMINAL PIN
Bruce A. Peterson, Schaumburg, Ill., assignor to Molex Incorporated, Lisle, Ill.
Filed Jul. 13, 1990, Ser. No. 556,779
Int. Cl.[5] H01R 13/428
U.S. Cl. 439—751 8 Claims

1. A terminal pin for press-fit engagement in a conductive hole in a circuit board, the pin including a compliant region adapted to be pressed into the conductive hole thereby to make a solder-free electrical connection between the pin and the board, said compliant portion comprising, in a lateral direction, a cross-section with an inverted U-shaped central portion with a non-inverted U-shaped portion at the end of each leg of the inverted U-shaped central portion, said non-inverted U-shaped portions being substantially shorter than said inverted U-shaped central portion such that the central portion also contacts the conductive hole, said inverted U-shaped portion being defined by two substantially straight and parallel walls.

5,035,660
ECCENTRIC ELECTRICAL CABLE CONNECTING DEVICE
Walter M. Werner, Downingtown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.
Filed Nov. 29, 1988, Ser. No. 277,103
Int. Cl.[5] H01R 11/09
U.S. Cl. 439—796 5 Claims




1. An electrical cable connecting device, comprising;
an elongated, cylindrical first member having an elongated laterally open groove; and
an elongated second member having an opening therethrough with a portion thereof being an eccentric bore, said second member being telescopingly received on said first member with said groove and said bore defining a cable-receiving passage which, when said first and second members are rotated relative to each other, decreases in diameter due to the eccentricity of said bore so that a cable, which may be positioned in said passage, is compressed and securely retained therein.

5,035,661
FLAT-CONTACT RECEPTACLE
Helmut Steinhardt, Dürnberg, and Anton Bieringer, Schwabach, both of Fed. Rep. of Germany, assignors to TRW Daut + Rietz GmbH & Co., Nuremberg, Fed. Rep. of Germany
PCT No. PCT/EP89/00813, § 371 Date Apr. 25, 1990, § 102(e) Date Apr. 25, 1990, PCT Pub. No. WO90/01815, PCT Pub. Date Feb. 22, 1990
PCT Filed Jul. 13, 1989, Ser. No. 469,585
Claims priority, application Fed. Rep. of Germany, Aug. 5, 1988, 3826670
Int. Cl.[5] H01R 4/48
U.S. Cl. 439—839 5 Claims

1. A flat-contact receptacle comprising:
a receptacle body having at least one recess for receiving a flexible latch located on a receptacle housing,
two contact tabs, each of which has a free end and a fixed end attached to said receptacle body and which are resiliently pressed against each other over part of their length under a spring load; and
an envelope spring having a spring body supported on and surrounding said receptacle body, two paired sets of

spaced-apart strip-shaped sections mounted on said spring body, one of said paired sets of spaced-apart strip-shaped sections being disposed to press against the outer surfaces of one of said tabs, and the other of said paired sets being disposed to press against the outer surfaces of the other of said tabs so as to define said spring load, and a pair of straps, each of which is mounted on opposite sides of said spring body with one of said straps disposed between and generally parallel to said one paired set of spaced-apart strip-shaped sections and the other of said straps being disposed between and generally parallel to said other paired set of spaced-apart strip-shaped sections, said straps each being associated with one of said contact tabs and each having a free end portion which is bent inwardly and backwardly to fit over the free end of the associated contact tab.

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**5,035,662**

## ARRANGEMENT IN CONNECTION WITH AZIMUTH PROPELLER DRIVE MEANS FOR SHIPS

**Norvald Royset, Hareid, Norway, assignor to Ulstein Propeller A/S, Ulsteinvik, Norway**

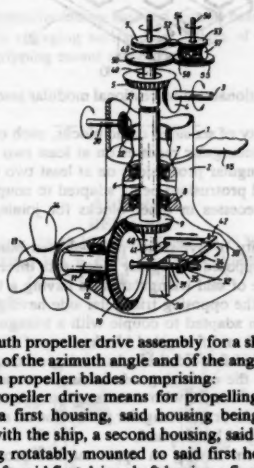
**PCT No. PCT/NO89/00039, § 371 Date Nov. 27, 1989, § 102(e) Date Nov. 27, 1989, PCT Pub. No. WO89/10299, PCT Pub. Date Nov. 2, 1989**

**PCT Filed Apr. 27, 1989, Ser. No. 435,444**

**Claims priority, application Norway, Apr. 29, 1988, 881909**

**Int. Cl.[5] B63H *3/00***

**U.S. Cl. 440—50** **6 Claims**



1. An azimuth propeller drive assembly for a ship to provide measurement of the azimuth angle and of the angle of attack of variable pitch propeller blades comprising:

azimuth propeller drive means for propelling the ship including a first housing, said housing being firmly connected with the ship, a second housing, said second housing being rotatably mounted to said first housing, a first drive shaft, said first drive shaft having a first coaxial bore, a first end and a second end, a tube extending through said first coaxial bore, said tube having an upper section and a lower section, said upper section extending beyond said first end and said lower section extending beyond said second end, said first end being connected to the engine of the ship, a first rod extending coaxially through the central bore of said tube and being rotatable relative to said tube, said first rod having an upper portion and a lower portion, said upper portion extending beyond said upper section and said lower portion extending beyond said lower section and being firmly connected within said second housing, said first drive shaft extending from connection with the engine through said first housing into said second housing, said second end being mounted inside said second housing, a second drive shaft having a second coaxial bore, a propeller end, and a drive end, said second drive shaft being engaged at said driving end for driving by said first drive shaft and extending from said driving end through a wall portion of said second housing with said propeller end being mounted with a propeller assembly, said propeller assembly having a plurality of variable pitch blades and a servo for varying the angle of attack of said plurality of variable pitch blades, a translation system located within said second housing, said translation system having a first operational end and a second operational end, a second rod extending within said second coaxial bore, said second rod having a servo end and a translation end, said servo end being linked to said servo, said translation end being linked to said first operational end, said second rod being axial displaceable along said second coaxial bore in response to varying the angle of attack of said plurality of variable pitch blades by said servo, said second operational end being connected to said lower section of said tube, and

means for display of the angular displacement of said tube and of the angular displacement of said fist rod, said means being connected to said upper section of said tube and to said upper portion of said first rod;

whereby a variation of the angle of attack of said plurality of variable pitch blades will cause a corresponding axial displacement of said second rod which will cause a corresponding angular displacement of said tube, the corresponding angular displacement of said tube being displayed on said means for display;

and whereby rotation of said second housing relative to said first housing will cause a corresponding angular displacement of said first rod, the corresponding angular displacement of said first rod being displayed on said means for display.

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**5,035,663**

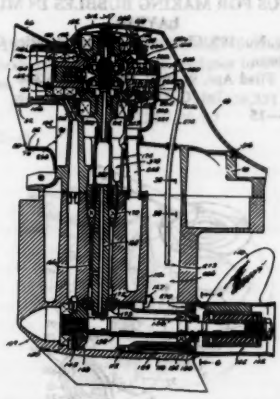
## MARINE PROPULSION DEVICE RETENTION MECHANISM

**Gerald F. Bland, Glenview; Martin J. Mondek, Wonder Lake, and Lawrence E. Zdanowicz, Waukegan, all of Ill., assignors to Outboard Marine Corporation, Waukegan, Ill.**

**Filed May 12, 1989, Ser. No. 351,703**

**Int. Cl.[5] B63H *23/08***

**U.S. Cl. 440—75** **26 Claims**



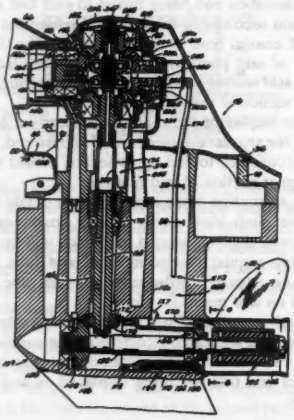
1. A marine propulsion device comprising a lower gearcase, a bearing housing which is supported by said lower gearcase and which includes an exterior surface having therein an annular groove, a propeller shaft rotatably supported by said bearing housing and adapted to have mounted thereon a propeller, and a retaining member which is supported by said lower gearcase and which extends into said groove.

5,035,664

## MARINE PROPULSION DEVICE GEAR ARRANGEMENT

Gerald F. Bland, Glenview; Martin J. Mondek, Wonder Lake, and Lawrence E. Zdanowicz, Waukegan, all of Ill., assignors to Outboard Marine Corporation, Waukegan, Ill.

Filed May 12, 1989, Ser. No. 351,172
Int. Cl.[5] B63H *23/08, 23/30*
U.S. Cl. 440—75 20 Claims



1. A marine propulsion device comprising a housing adapted to be mounted on the transom of a boat, a first gear rotatably supported by said housing and being operably non-disengageable with respect to an engine output shaft, a second gear which is rotatably supported by said housing, which includes a gear tooth portion that meshes with and is driven by said first gear and which is adapted to be drivingly connected to a propeller, and a third gear meshing with and driven by said gear tooth portion of said second gear.

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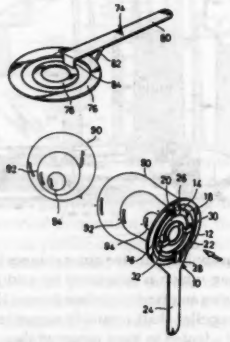
5,035,665

## APPARATUS FOR MAKING BUBBLES IN MULTIPLE LAYERS

Lin M. Sheng, No. 195, Chieng-Kou Road, Hsintien City, Taipei Hsien, Taiwan

Filed Apr. 9, 1990, Ser. No. 506,346
Int. Cl.[5] A63H *33/28*
U.S. Cl. 446—15 8 Claims



1. A bubble blowing apparatus comprising:
a) first and second rings, each ring being flat and having a width greater than its thickness, the first ring being of larger diameter than the second ring;
b) the second ring being concentrically disposed within the first ring and in a substantially coplanar relation therewith;
c) means securing the first and second rings together to define an uninterrupted annular spacing therebetween; and
d) a flat handle extending outwardly from an outer periphery of the first ring, the handle being disposed in a plane that is substantially parallel with the plane of the rings.

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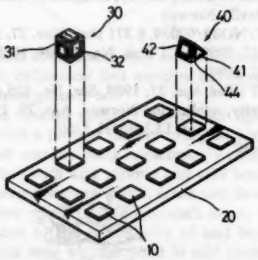
5,035,666

## BLOCKS WITH PLATFORM, WHEEL AND RECESSES

Yung J. Kang, Seoul, Rep. of Korea, assignor to Dae Kyo Limited, Seoul, Rep. of Korea

Filed Nov. 22, 1989, Ser. No. 440,147
Int. Cl.[5] A63H *33/06, 33/00, 33/08*
U.S. Cl. 446—118 4 Claims



1. An educational and recreational modular assembly system comprising:
(a) a plurality of six-sided cubic blocks, each of said blocks having rectangular recesses on at least two of said sides and rectangular protrusions on at least two other of said sides, said protrusions being adapted to couple with rectangular recesses in other blocks for joining blocks together;
(b) a plurality of five-sided, prism-shaped blocks having a pair of opposed triangular sides and three rectangular sides, one of said triangular sides having a triangular recess and the opposing triangular side having a triangular protrusion adapted to couple with a triangular recess on another of said five-sided blocks, two of the rectangular sides of said five-sided blocks having rectangular protrusions and the remaining side having a rectangular recess adapted to couple with a rectangular protrusion on said cubic blocks or a rectangular protrusion on another of said prism-shaped blocks; and,
(c) a platform having an upper surface provided with a plurality of rectangular protrusions, each of which is adapted to couple with a rectangular recess in said cubic blocks or a rectangular recess in said prism-shaped blocks.

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5,035,667

## SWIVEL DEVICE FOR PREVENTING TWISTING OF STRINGS SUBJECTED TO TORSIONAL FORCE

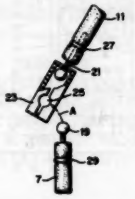
Thomas F. Haley, 2701 S. Roan St., Johnson City, Tenn. 37601

Filed Sep. 8, 1989, Ser. No. 404,637
Int. Cl.[5] A63H *1/06*
U.S. Cl. 446—247 4 Claims

1. A swivel device for preventing twisting of a yo-yo string for placement between a first segment of the yo-yo string attached to the yo-yo and a second segment of the yo-yo string provided with an operator grip, comprising:
shaft means for forming a pivotal axis concentric with the elongate central axis of said string segments;
first gripping means including a hollow cylindrical portion,

a first opening at a first end of said cylindrical portion for receipt of a first one of said string segments, and a second opening at a second end of said cylindrical portion for receipt of a first end of said shaft means and including an annular ledge encircling said respective second opening, said cylindrical portion having deformable walls for compressional engagement of said string segment upon inward deformation after receipt of said segment; and

second gripping means including a hollow cylindrical portion, a first opening at a first end of said cylindrical portion




for receipt of a second one of said string segments, and a second opening at a second end of said cylindrical portion for receipt of a first second end of said shaft means and including an annular ledge encircling said respective second opening, said cylindrical portion having deformable walls for compressional engagement of said string segment upon inward deformation after receipt of said segment;

said shaft means including first and second head portions for abuttingly engaging said annular ledges of said first and second gripping means respectively.

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**5,035,668**

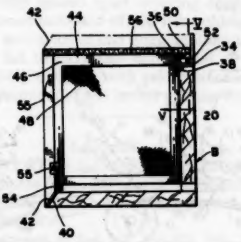
**BEEHIVE**

**Alexander Ungar, 75-22 172nd St., Flushing, N.Y. 11366**

**Filed Jun. 6, 1990, Ser. No. 534,045**

**Int. Cl.[5] A01K *47/00, 47/02***

**U.S. Cl. 449—6** **8 Claims**




1. A beehive comprising:

a housing including sidewalls, an end wall, and a bottom wall, said end wall having a ledge support surface with a ramp;

a plurality of frames disposed said housing in a parallel configuration, each frame including projection means for supporting said frames from said support surface, said frames being vertically spaced from said support surface to minimize the contact surface therewith; and

door means hingedly mounted on said sidewalls to allow selective insertion and removal of said frames from said housing.

**5,035,669**

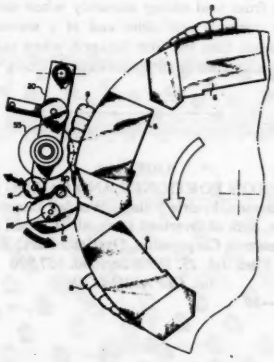
**CUTTER CAM ADJUSTMENT ASSEMBLY**

**Edmund D. Betts, Libertyville, Ill., assignor to Gregor Jonsson Associates, Inc., Highland Park, Ill.**

**Filed May 16, 1990, Ser. No. 524,631**

**Int. Cl.[5] A22C *29/02***

**U.S. Cl. 452—5** **28 Claims**



1. A shrimp peeling machine comprising:

a clamp means for holding a shrimp;

a knife assembly positioned relative to said clamp means;

said knife assembly including a pivotable arm member;

a knife means disposed on said arm for cutting a shrimp shell and meat; and, a cam follower connected to said arm;

a rotatable member;

a cam releasably fixed to said rotatable member and having a cam surface adapted to be contacted by said cam follower to generate a cam path; and

means disposed on said rotatable member and cam for adjustably positioning said cam on said rotatable member to alter said cam path relative to said rotatable member whereby said knife means will move in a direction toward or away from said clamp assembly as said cam follows said cam path.

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**5,035,670**

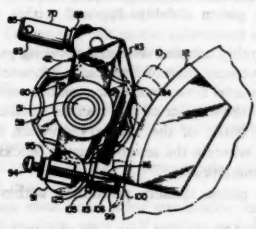
**CUTTER HEIGHT ADJUSTMENT MEANS**

**James E. Pershinske, McHenry, Ill., assignor to Gregor Jonsson Associates, Inc., Highland Park, Ill.**

**Filed May 16, 1990, Ser. No. 524,331**

**Int. Cl.[5] A22C *29/02***

**U.S. Cl. 452—5** **19 Claims**



1. Apparatus for adjusting the position of a shrimp cutting blade relative to a shrimp clamp assembly on which a shrimp is fixed and adapted to be cut, said apparatus comprising:

a pivotable arm upon which a cutter blade is disposed;

an adjusting member connected to said pivotable arm;

an adjusting assembly for adjusting the position of said ad-

justing member, said assembly comprising a shim retention member;

at least one shim connected to said shim retention member and including means for moving said shim into an operative position whereby said shim contacts said adjusting member to an inoperative position whereby said shim is free of contact with said adjusting member whereby said pivotable arm and blade are maintained at a first spaced distance from said clamp assembly when said adjusting member contacts said shim and at a second distance, which is less than the first distance, when said adjusting member is located in an inoperative position.

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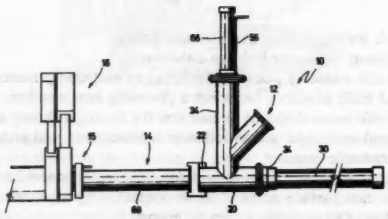
5,035,671

## DUAL PISTON PORTIONER AND CASING DEVICE

James E. Anderson, Prairie Village; Wendell Dennis, and Richard Powers, both of Overland Park, all of Kans., assignors to Marlen Research Corporation, Overland Park, Kans.

Filed Jul. 25, 1990, Ser. No. 557,930
Int. Cl.[5] A22C *11/04*
U.S. Cl. 452—37 14 Claims



1. A device for handling a flowable material such as meat and discharging the same as discrete portions, said device being adapted for connection between an upstream material pumping means and a downstream processing unit designed to receive and handle said discrete portions, said portioning device comprising:

an elongated transfer conduit having a forward material outlet end adapted for connection with said unit and an opposed, rearward end;

an elongated auxiliary conduit operably coupled with and in communication with the interior of said transfer conduit between the opposed ends of the latter,

said auxiliary conduit having a material outlet end adjacent said transfer conduit and structure defining a material inlet in communication with the interior thereof and adapted for connection with said pumping means;

a severing piston slidably disposed within said auxiliary conduit;

means operably coupled with said severing piston for selective movement thereof between a retracted position for open, material flow communication between said material inlet and the interior of said transfer conduit through the material outlet of the auxiliary conduit, and a closing position wherein the severing piston blocks said material flow communication;

a transfer piston slidably positioned within said transfer conduit;

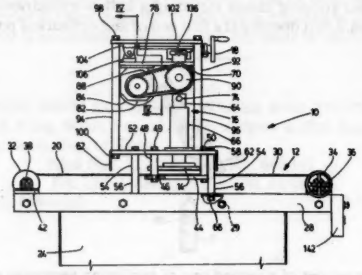
means operably coupled with said transfer piston for selective movement thereof to a retracted position rearward of the material outlet end of the auxiliary conduit allowing flow of material into the transfer conduit, and for forward movement of the transfer piston towards said transfer conduit outlet end for delivery of material out said transfer conduit outlet.

5,035,672

## MEAT PREPARATION MACHINE

Joaquim Rocha, and Jose Daniel, both of Mississauga, Canada, assignors to Danro Tool Company Inc., Ontario, Canada

Filed Feb. 26, 1990, Ser. No. 484,908
Int. Cl.[5] A22C *9/00*
U.S. Cl. 452—141 20 Claims



1. A meat tenderizing machine comprising:

meat support means for supporting a cut of meat during operation of the machine,

a press plate having teeth on a lower surface thereof for affecting tenderization of the cut of meat, said plate extending parallel to an upper surface of said meat support means,

means for reciprocating said press plate towards and away from said support means, and

means for adjusting said reciprocating means and thereby the reciprocal movement of said press plate in order that the distance between said lower surface of said press plate and said upper surface of said meat support means when the press plate is in a fully lowered position is a desired distance.

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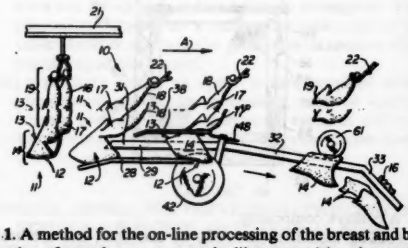
5,035,673

## ON-LINE BREAST HALVER

Jacobus R. Hazenbroek, Burg de Zeeuwstraat 52, Numansdorp, Netherlands

Continuation-in-part of Ser. No. 472,891, Jan. 31, 1990. This application Jan. 31, 1990, Ser. No. 472,719
Int. Cl.[5] A22C *21/00*
U.S. Cl. 452—149 21 Claims



1. A method for the on-line processing of the breast and back portion of a poultry carcass or the like, comprising the steps of;

moving a plurality of previously eviscerated poultry carcasses in series along a processing path with the legs of the carcasses suspended from the processing line, the visceral opening of the carcasses facing upwardly and in the direction of movement of the carcasses and the neck openings facing downwardly, as each carcass moves along the processing line;

mounting the visceral cavity of the carcass on an internal guide rail with the back of the carcass riding on the inter-

nal guide rail, and as the carcass moves along the guide rail:

passing the carcass through a Y-shaped opening formed between a pair of parallel guide plates with the legs and thighs and lower back passing above the plates and the breast and upper back passing below the plates,

supporting the thighs on the plates, splitting the breast into halves,

cutting through the back of the carcass between the breast and thighs of the carcass to separate the legs and thighs and lower back from the breast and upper back of the carcass, and

cutting along the backbone of the upper back of the carcass.

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**5,035,674**

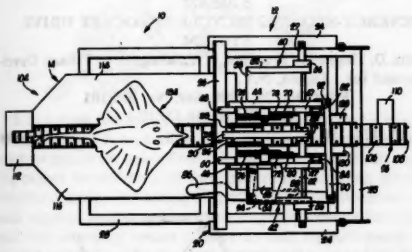
## MACHINE FOR CUTTING WINGS OF SKATE FISH

**Robert R. Reich, Odessa, Mo., and Jan Olesen, Warwick, R.I., assignors to Triple R. Designs, Inc., Odessa, Mo.**

**Filed Jun. 4, 1990, Ser. No. 532,669**

**Int. Cl.[5] A22C *25/16***

**U.S. Cl. 452—169** **9 Claims**



1. Apparatus for severing the wing sections of fish having broad, flattened bodies such as skates, rays or the like, said apparatus comprising:

means for supporting and moving a fish having said wing sections toward and into a severing station;

means adjacent said severing station for holding said fish in place during severing operations, including structure for adjustment of said fish-holding means for accommodating fish of varying size said fish-holding means comprising a pair of laterally spaced apart, rotatable members;

a pair of laterally spaced apart severing elements respectively positioned outboard of said fish-holding means and oriented for severance of said wing sections during movement of the fish through said station; and

means operatively coupled with said pair of elements for selective adjustment of the lateral spacing therebetween.

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**5,035,675**

## CONVERTIBLE COMBINE ROTOR

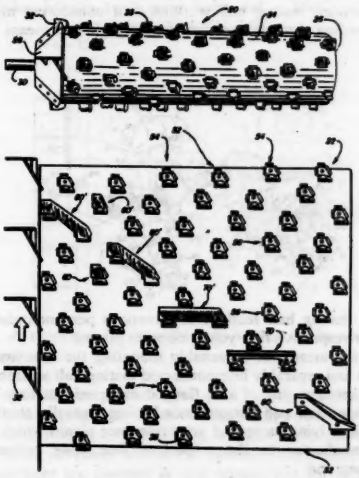
**Neil C. Dunn, Trenton, Mo.; Richard E. McMillen, Plainfield, and Jon E. Ricketts, Viola, both of Ill., assignors to J. I. Case Company, Racine, Wis.**

**Continuation-in-part of Ser. No. 758,313, Jul. 24, 1985, abandoned. This application Feb. 16, 1990, Ser. No. 482,008**

**Int. Cl.[5] A01F *12/22***

**U.S. Cl. 460—62** **20 Claims**

1. An axial-flow rotor for a rotary threshing combine or the like comprising a generally cylindrical drum defining an outer wall portion defining an entry section and an exit section, a plurality of relatively long helically disposed and straight thresher elements disposed about the circumference of said entry section, a plurality of outwardly extending mounting means secured to the surface of said exit section of said wall portion around the entire circumference of said wall portion and forming various arrays of helical rows, circumferential rows and longitudinal rows, thresher elements interchangeably and releasably connectable to only a portion of said mounting means to form, as desired, longitudinal, circumferential, helical, or combinations of such orientations of such thresher elements to obtain for any given crop being harvested the desired threshing action by the rotor at any designated section around the circumference of the rotor in an axial direction to maximize the efficiency of the threshing and separating action, and connector means for releasably connecting said thresher



elements to said mounting means, whereby the threshing combine can be used to interchangeably handle different crops quickly and easily by merely releasing the connector means and replacing and/or shifting of the existing threshing elements to different locations on the rotor by using a different portion of said mounting means, thus enabling an operator to thresh a wide variety of crops with only one rotor and a plurality of threshing elements of different sizes, shapes, surfaces, and configurations.

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**5,035,676**

## SPLIT YOKE UNIVERSAL JOINT

**Robert K. Koelling, Sr., Dallas, Tex., assignor to Morgan Construction Company, Worcester, Mass.**

**Continuation of Ser. No. 170,717, Mar. 21, 1988, abandoned, which is a continuation of Ser. No. 909,770, Sep. 19, 1986, abandoned, which is a continuation of Ser. No. 744,227, Jun. 13, 1975, Pat. No. 4,637,807. This application Feb. 15, 1989, Ser. No. 311,443**

**The portion of the term of this patent subsequent to Jan. 20, 2004, has been disclaimed.**

**Int. Cl.[5] F16D *3/40***

**U.S. Cl. 464—135** **3 Claims**

1. A high torque universal joint for providing a drive connection between the flanged ends of two rotatable elements, said joint comprising:

a cross formed by two mutually perpendicular pairs of coaxially aligned trunnions;

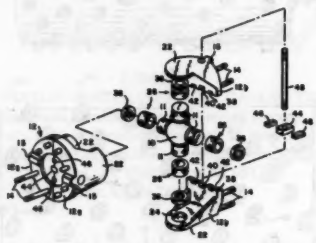
a pair of yokes, each yoke being subdivided into separate mating half sections, each half section including a base portion with an integral forwardly protruding bearing cap having a blind bore formed therein;

bearings contained in said blind bores, the mating half sections of each yoke being adapted for assembly onto a pair of said trunnions, with each trunnion being journalled for rotation in one of said bearings, and with the base portions of the thus assembled mating half sections having juxta-

posed surfaces located on opposite sides of a first yoke reference plane passing through the center of the joint;

first interengagement means extending across said first yoke reference planes for opposing relative movement of the thus assembled mating half sections in directions parallel to said first yoke reference plane, said first interengagement means comprising a key extending into complimentary opposed keyways centrally located in said juxtaposed surfaces;

connecting means for separably interconnecting the thus assembled mating half sections, said connecting means extending through said first interengagement means and



said mating half sections in directions perpendicular to their respective first yoke reference planes;

mounting means for detachably mounting the thus assembled and separably interconnected mating half sections to a respective one of said flanged ends, said mating half sections and said flanged ends having mutually abutting surfaces lying on second yoke reference planes which are perpendicular to the respective first yoke reference planes; and

second interengagement means extending across said second yoke reference planes for mechanically coupling the thus assembled, interconnected and mounted mating half sections to their respective flanged ends.

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**5,035,677**

## A UNIVERSAL POWER TRANSMISSION JOINT HAVING A PAIR OF DRIVE PINS FIXED IN PARALLEL BY A TIE MEMBER

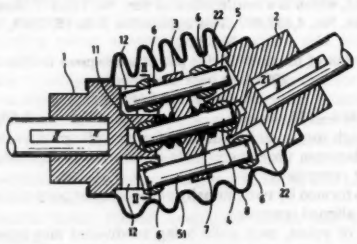
**Hisanobu Kanamaru, Ibaraki, and Naotatsu Asahi, Chiba, both of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Powdered Metals Co., Ltd., Chiba, all of, Japan**

**Filed Jul. 21, 1989, Ser. No. 383,213**

**Claims priority, application Japan, Jul. 29, 1988, 63-188484**

**Int. Cl.[5] F16D *3/16***

**U.S. Cl. 464—138** **12 Claims**



1. A power transmission joint comprising:

a pair of rotational members arranged with an axial space between opposite ends thereof, each of said pair of rotational members having an axis of rotation and axially extending bearing grooves formed symmetrically with respect to the axis of rotation in said opposite ends, each of said bearing grooves having a pair of radially extending partially cylindrical surfaces for receiving a spherical bearing and allowing said spherical bearing to radially and rotatably move;

a guide pin disposed between each pair of rotational members and having end portions thereof rotatably and swingably engaged with said opposite ends of said rotational members at the respective axis of rotation of the rotational members;

a pair of drive pins each disposed between said opposite ends of said pair of rotational members and arranged in parallel and symmetrically disposed with respect to an axis of said guide pin and engaged with the opposite ends of said rotational members so as to transmit torque while allowing said drive pins to slide in radial directions of said rotational members, swing and axially slide relative to said rotational members, respectively in accordance with a rotation of the rotational members, each of said drive pins are axially slidably inserted in spherical bearings held in said bearing grooves; and

a tie member disposed between said opposite ends of said rotational members and rigidly tying said guide pin and said drive pins so as to maintain a fixed relative condition of said guide pin and said drive pins.

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**5,035,678**

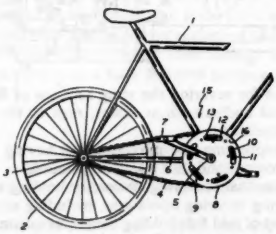
## ENERGY-STORING BICYCLE SPROCKET DRIVE SYSTEM

**Martin D. Hageman, Freedom, N.Y., assignor to Trilach Development Inc., Angola, N.Y.**

**Filed Oct. 26, 1990, Ser. No. 605,101**

**Int. Cl.[5] F16H *55/30***

**U.S. Cl. 474—50** **12 Claims**



1. An energy-storing bicycle sprocket drive system comprising:

(a) a shaft having a longitudinal axis;

(b) a crank operatively arranged to rotate said shaft about the longitudinal axis,

said crank having a rotational cycle wherein said crank moves through a point of minimum applied leverage and a point of maximum applied leverage in the rotational cycle;

(c) a drive plate journalled to said shaft such that said drive plate rotates about said longitudinal axis,

said drive plate having an outer surface;

said outer surface having at least one opening;

said opening having an inner surface of the drive plate; and

said inner surface having at least one end wall;

(d) a wheel facing the drive plate, freely rotatable about the longitudinal axis of the shaft;

(e) at least one drive peg mounted to said wheel such that said drive peg is positioned parallel to said longitudinal axis wherein said drive peg extends into the opening causing the wheel to interlock with the drive plate; and

(f) a spring mounted within the opening between the end wall and the drive peg,

said spring having a compressed state and an extended state wherein in said compressed state the spring stores energy and exerts a first force on the drive peg causing the wheel to revolve as the crank passes through the point of maximum applied leverage; and

whereby as the crank passes through the point of minimum applied leverage, the spring releases energy causing the spring to transform into the extended state while applying a second force on the drive peg.

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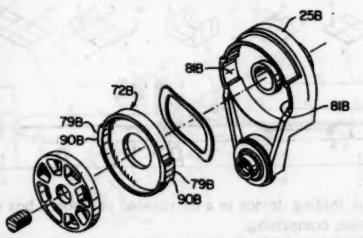
5,035,679

## BELT TENSIONER AND METHOD OF MAKING THE SAME

Nancy M. Green, and Mark P. Foley, both of Springfield, Mo., assignors to Dayco Products, Inc., Dayton, Ohio

Continuation-in-part of Ser. No. 513,718, Apr. 24, 1990, which is a division of Ser. No. 403,537, Sep. 6, 1989, Pat. No. 4,938,734. This application Dec. 11, 1990, Ser. No. 626,088
Int. Cl.[5] F16H 7/08
U.S. Cl. 474—135 16 Claims




1. In a tensioner for a power transmission belt that is adapted to be operated in an endless path, said tensioner comprising a support means for being fixed relative to said belt, a belt engaging means carried by said support means and being movable relative thereto, first spring means operatively associated with said support means and said belt engaging means for urging said belt engaging means relative to said support means and against said belt with a force to tension said belt, and frictional dampening means operatively associated with said support means and said belt engaging means to dampen the movement of said belt engaging means relative to said support means in at least one direction of movement thereof, said dampening means having a longitudinal axis, said support means comprising a shaft means having a longitudinal axis and being fixed from movement relative to said belt engaging means, said belt engaging means having a portion thereof being rotatably carried by said shaft means so as to rotate relative to said shaft means, said dampening means comprising a pair of frictionally engaging first and second parts with said first part comprising an annular pad of friction material that is coaxially disposed and axially movable on said shaft means relative to said second part, and second spring means urging said first part against said second part with a certain spring force, said first part of said dampening means having guide means thereon, said portion of said belt engaging means having opening means therein that receive said guide means therein to guide axial movement of said first part whereby said first part of said dampening means rotates in unison with said portion of said belt engaging means, said annular pad and said guide means of said first part of said dampening means comprising a one-piece homogeneous member, said second part of said dampening means comprising an end plate secured to said shaft means whereby said end plate remains stationary with said support means as said first part rotates with said belt engaging means relative thereto, said end plate having a cylindrical outer periphery, said portion of said belt engaging means having a cylindrical part disposed substantially concentrically about said cylindrical outer periphery of said end plate, said first part of said dampening means comprising a tubular sleeve-like means disposed between said cylindrical outer periphery of said end plate and said cylindrical part of said belt engaging means to act as a bushing therebetween, the improvement wherein said guide means project outwardly from said tubular sleeve-like means, said opening means that receive said guide means therein being disposed in said cylindrical part of said belt engaging means.

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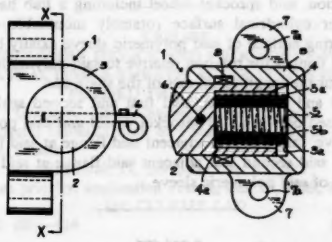
5,035,680

## BELT OR CHAIN TENSIONER FOR POWER TRANSMITTING SYSTEM

Juji Ojima, Aikawa, Japan, assignor to NHK Spring Co., Ltd., Yokohama, Japan

Filed Jun. 29, 1990, Ser. No. 545,693
Claims priority, application Japan, Jul. 5, 1989, 1-173549
Int. Cl.[5] F16H 7/08
U.S. Cl. 474—138 3 Claims




1. A tensioner for tensioning a belt or chain adequately, comprising:

a tension rod;

a multiple compression spring for urging said tension rod and keeping said tension rod in an urged position, adjacent compression springs of said multiple compression spring being reversely wound and coaxially assembled; and

a stopper pin inserted in said tension rod for locking the tension rod when not in use.

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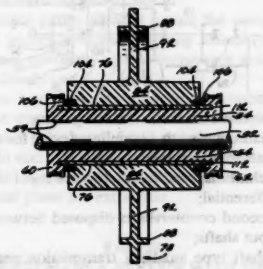
5,035,681

## REDUCED FRICTION SPROCKET ASSEMBLY FOR USE IN CORROSIVE ENVIRONMENTS

Karl R. Hertel, Delafield, and James H. Wiegand, Franklin, both of Wis., assignors to Envirex Inc., Waukesha, Wis.

Continuation of Ser. No. 337,580, Apr. 13, 1989, abandoned. This application Jul. 11, 1990, Ser. No. 551,056
Int. Cl.[5] F16H 55/30
U.S. Cl. 474—152 42 Claims



17. A sprocket assembly supportable on a shaft having a longitudinal axis, said sprocket assembly comprising:

a polymeric sleeve including an inner cylindrical surface mountable on the axially extending shaft for surrounding a portion of the shaft, said polymeric sleeve being formed generally of polyurethane and including a low friction bearing surface formed of a thin layer of ultra high molecular weight polyethylene polymerized to said polyurethane, said polymeric sleeve including a first end and a second end for location with respect to the longitudinal axis, a generally cylindrical flange being defined at each of

said ends, said polymeric sleeve being split diametrically to define a first section and a second section, each of said flanges including a circumferential groove configured to house a clamp for securing said first section and said second section of said polymeric sleeve to the shaft, said ultra high molecular weight polyethylene bearing surface being defined by an insert formed in the general shape of an open ended cylinder, said insert including opposite ends extending axially into each of said flanges, the outer radius of said insert being less than the radius of each of said flanges, when said polyethylene sleeve is assembled;

a sprocket wheel which is split to define a first generally semi-circular section and a second generally semi-circular section, said sprocket wheel including a hub having an inner cylindrical surface rotatably mountable on said bearing surface of said polymeric sleeve axially between said flanges for rotation relative to said polymeric sleeve about the longitudinal axis of the shaft; and

a first and second seal, said first and second seals being housed between said sprocket wheel and said polymeric sleeve, said first seal adjacent said flange at said first end and said second seal adjacent said flange at said second end of said polymeric sleeve.

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**5,035,682**

## AUTOMOTIVE TRANSMISSION APPARATUS

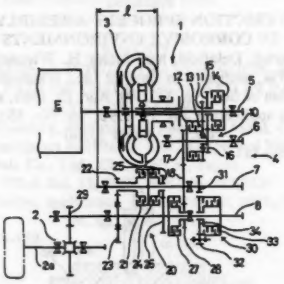
**Hiroshi Nakayama; Hiroyuki Shimada, and Toshiyuki Yumoto, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 199,474, May 27, 1988, abandoned. This application Feb. 9, 1990, Ser. No. 483,957**

**Claims priority, application Japan, May 27, 1987, 62-128464; May 27, 1987, 62-128465**

**Int. Cl.[5] F16H *3/08***

**U.S. Cl. 475—66** **16 Claims**



1. An automotive transmission comprising:

an input shaft coupled to a coupling device for coupling said input shaft to an engine;

an output shaft disposed parallel to the input shaft for driving a differential;

first and second countershafts disposed between said input and output shafts;

a countershaft type auxiliary transmission gear train with gears on and connecting said input shaft and said first countershaft and having at least two selectable gear trains, said first and second countershafts being connected by normally meshing gears; and

a countershaft type main transmission gear train with gears on and connecting said second countershaft and said output shaft, said main transmission gear train having a portion positioned laterally of the rotational axis of and axially overlapping and adjacent to the coupling device, said auxiliary transmission gear train being positioned axially adjacent the coupling device.

**5,035,683**

## FOLDING DEVICE IN A CORRUGATED CARDBOARD BOX MAKING MACHINE

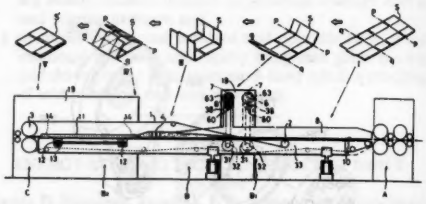
**Junichi Takeda, Hakui, and Haruo Yoshizuka, Kanazawa, both of Japan, assignors to Kabushiki Kaisha Ishikawa Seisakusho Ltd., Kanazawa, Japan**

**Filed Apr. 5, 1990, Ser. No. 505,132**

**Claims priority, application Japan, Apr. 7, 1989, 1-88574**

**Int. Cl.[5] B31B *1/58***

**U.S. Cl. 493—23** **2 Claims**



2. A folding device in a corrugated cardboard box making machine, comprising:

a folding belt for folding a side portion of a corrugated cardboard sheet along a creasing line and folding down the sheet;

an upper guide for folding a side portion of the corrugated cardboard sheet at a right angle between the folding belt and the upper guide;

a gauge belt for regulating the folding width of the folded corrugated cardboard sheet;

a belt supporting member for supporting the folding belt;

a guide supporting member for supporting the upper guide;

a gauge belt supporting member for supporting the gauge belt;

main transporting means for positioning the belt supporting member, the guide supporting member, and the gauge belt supporting member at predetermined positions;

upper guide transporting means for moving the guide supporting member independently relative to the belt supporting member and positioning the guide supporting member at a predetermined position;

gauge belt transporting means for moving the gauge belt supporting member independently relative to the belt supporting member and positioning the gauge belt supporting member at a predetermined position;

control means wherein data on the amount of transport of the upper guide and the amount of transport of the gauge belt are stored for controlling the drive of the upper guide transporting means and the gauge belt transporting means;

a first screw shaft to be screwed in the belt supporting member;

a nut attached to the guide supporting member;

a second screw shaft to be screwed in the nut;

a motor connected to either one of the screw shafts;

transmitting means for transmitting the rotation of one of the screw shafts to another one of the screw shafts;

a rotative member attached to the guide supporting member;

a third shaft fitted in the rotative member so that the rotative member can move axially with respect to the third shaft and wherein the rotative member is rotatably fixed with respect to the third shaft;

a motor connected to said third shaft; and

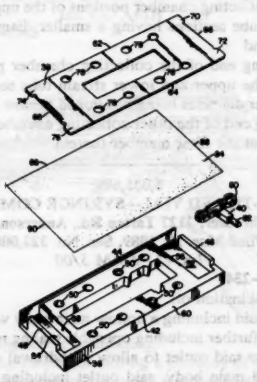
rotation transmitting means for interactively transmitting the rotation of the nut and the rotative member.

**5,035,684**

## PAD SANDER PAPER PUNCH ASSEMBLY AND METHOD

**Anthony M. Sorrells, Easley, S.C., assignor to Ryobi Motor Products Corp., Pickens, S.C.**

**Filed Apr. 26, 1990, Ser. No. 514,550**
**Int. Cl.[5] B31B *49/00***
**U.S. Cl. 493—342** **3 Claims**



2. An assembly for cutting to size, and perforating air suction holes in, a sheet of abrasive material for use with a powered pad sander having spaced suction holes in its platen, comprising:

a base member including a substantially rectangular planar surface portion, a first straight wall extending along an edge of said surface portion and projecting substantially perpendicular thereto, and a pair of second straight walls perpendicular to said first wall and projecting substantially perpendicular to said surface portion in the same direction as said first wall, the distance between said pair of second walls being substantially equal to the width of a standard size sheet of sandpaper so that said first wall and said pair of second walls can accurately locate a standard size sheet of sandpaper on said surface portion with an edge of said sheet abutting said first wall, said base member being formed with a plurality of perforations through said surface portion and spaced the same as the spaced suction holes in the sander platen, said pair of second straight walls of said base member being spaced from said first straight wall of said base member and extending away from said first straight wall for a distance less than the width of the sander platen;

a substantially rectangular plate member sized so that when a first edge of said plate member abuts said base member first wall with said plate member overlying said surface portion of said base member, the opposed edges of said plate member which are perpendicular to said plate member first edge abut respective ones of said pair of second walls, the distance between said plate member first edge and the edge of said plate member opposite thereto being substantially equal to the width of the sander platen, said plate member being formed with a plurality of spaced perforations therethrough which align with the spaced perforations in said base member when said plate member is positioned on said base member surface portion with said first and opposed edges of said plate member abutting said first wall and said pair of second walls, respectively, said plate member being formed with a pair of tabs extending beyond each of said opposed edges and spaced apart the length of said second straight walls of said base member so that each pair of tabs flanks a respective one of said base member second straight walls when said plate member is properly positioned on said base member surface portion; and

punch means for extending through a perforation in said plate member and an aligned perforation in said base member so as to perforate a sheet of abrasive material held between said plate member and said base member;

whereby a standard size sheet of sandpaper can be located on said base member surface portion, said plate member can be overlaid on said sandpaper, the sandpaper can be torn against said plate member opposite edge so that it is sized for installation on the sander platen, and the sandpaper can be perforated in locations corresponding to the spaced suction holes in the sander platen.

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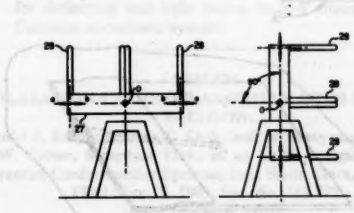
**5,035,685**

## RECOVERY DEVICE AND PROCEDURE FOR EXTRACTING A SHEATH AFTER IT HAS BEEN FOLDED TRANSVERSELY

**Claude Granger, Saint-Chamond, and Bernard Troadec, Plougastel Daoulas, both of France, assignors to Atochem, Paris, France**

**Filed Jul. 11, 1990, Ser. No. 551,525**
**Claims priority, application France, Jul. 12, 1989, 8909382**
**Int. Cl.[5] B31F *1/00***
**U.S. Cl. 493—416** **11 Claims**



1. In a machine for forming a segment of tubular sheath having been folded transversely at least once, in which a fixed frame allows the vertical unwinding of an open sheath and has columns serving as vertical guides to a mobile annular gripping assembly for gripping the outside of a sheath at a distance equal to at least twice the desired height of the fold and for lowering from this height after releasing the sheath and in which means are provided to maintain the form of the inside of the folded segment of the sheath when it is severed from unfolded sheath, the improvement comprising:

(a) a rotatable platen located within the periphery of said vertical guides and said gripping assembly for forming folds, said rotatable platen supporting said segment of folded sheath, and

(b) at least two movable conformators mounted on said rotatable platen such that said conformators delimit a deformable periphery of said sheath, and

(c) wherein said platen and said conformators rotate so as to bring said segment of folded sheath into an essentially horizontal plane for extraction.

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**5,035,686**

## CATHETER EXCHANGE SYSTEM WITH DETACHABLE LUER FITTING

**James F. Crittenden, Hollis, N.H., and George J. Purtell, Dracut, Mass., assignors to C. R. Bard, Inc., Murray Hill, N.J.**

**Filed Jan. 27, 1989, Ser. No. 303,549**
**Int. Cl.[5] A61M *29/00***
**U.S. Cl. 604—96** **17 Claims**

1. A balloon dilatation catheter assembly comprising:

a tubular shaft having a tubular proximal end and defining a lumen extending therethrough;

a dilatation balloon mounted to the distal end of the shaft and in communication with the lumen;

a fitting for communicating with the lumen, the fitting being detachably connected to the proximal end of the shaft; and

a second elongate tubular flexible element having a lumen extending therethrough and being advanceable over the shaft of the dilatation catheter.

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**5,035,687**

**ADHESIVE DRESSINGS**

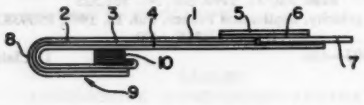
**Barry M. Sandbank, Bishop's Stortford, United Kingdom, assignor to Smith & Nephew plc, England**

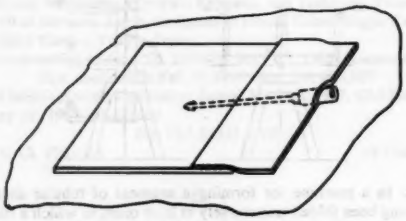
**Filed Nov. 15, 1988, Ser. No. 271,520**

**Claims priority, application United Kingdom, Nov. 16, 1987, 8726777**

**Int. Cl.[5] A61F *13/02*; A61M *25/02***

**U.S. Cl. 604—180** **36 Claims**



1. An adhesive dressing comprising a backing layer having over a surface thereof a pressure sensitive adhesive layer, a removable protector having a release coated surface which covers the adhesive layer and handling means at one edge of the backing layer, the dressing having a fold in a direction parallel to the handling means with the backing layer on the outside of the fold and means releasably attaching a portion of the dressing beyond the fold to a portion of the dressing before the fold, the protector extending beyond the edge of the backing film at the edge opposite the handling means, and wherein the extended portion of the protector is folded so that a portion of its release coated surface contacts an adhesive surface of the means releasably attaching the portion of the dressing beyond the fold to the portion of the dressing before the fold.

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**5,035,688**

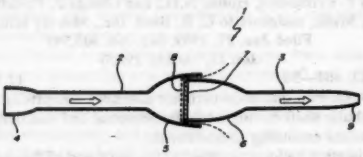
**POLYP OR CELL BLOCK COLLECTING INSTRUMENT**

**Masahiko Inui, 909 Kamiyama Apt., 1–10–1 Kamiyama, Ichinomiya City, Aichi 491, Japan**

**Filed Apr. 6, 1989, Ser. No. 334,689**

**Int. Cl.[5] A61M *5/00***

**U.S. Cl. 604—190** **6 Claims**



1. A tissue collecting instrument adapted for use with an endoscope having a suction passage, including:

an upper stream section having a suction passage connecting end configured for connection in the suction passage of an endoscope and having a collecting chamber portion of expanded diameter with a coupling end;

a lower stream tube section having a suction passage connecting end configured for connection in the suction passage of an endoscope and having a collecting chamber portion of expanded diameter with a coupling end;

a filter member fixedly mounted within and against the one of the collecting chamber portions of the upper and lower stream tube sections having a smaller diameter than the other; and

the coupling end of the collecting chamber portion of the one of the upper and lower stream tube sections having the larger diameter being positioned against and about the coupling end of the other collecting chamber portion and also about the filter member therein.

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**5,035,689**

**LUER-LOC-TIPPED VIAL—SYRINGE COMBINATION**

**Thomas J. Schroeder, 2127 Tartan Rd., Anderson, Ind. 46012**

**Filed Mar. 13, 1989, Ser. No. 322,008**

**Int. Cl.[5] A61M *5/00***

**U.S. Cl. 604—234** **15 Claims**

1. The combination of:

a vial of liquid including a hollow main body with an outlet, said vial further including openable sealing means extending across said outlet to allow withdrawal of said liquid from said main body, said outlet including first locking means having a luer-loc flange integrally formed thereon; and,

a hollow casing including a plunger slidably mounted therein, said casing including an inlet and second locking means positioned adjacent said inlet and non-removable therefrom, said inlet connectable with said outlet with said second locking means removable lockable directly to said luer-loc flange of said first locking means to secure said vial to said casing as said plunger is moved away from said inlet withdrawing said liquid from said vial into said casing, said casing further including a needle mountable to said inlet once said vial is removed therefrom.

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**5,035,690**

**Patent Not Issued For This Number**

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**5,035,691**

**HOT-MELT MOISTURE INDICATOR MATERIAL FOR DISPOSABLE ARTICLES**

**John M. Zimmel, St. Paul; Mark G. Katsaros, Mahtomedi, and William L. Bunnelle, Hugo, all of Minn., assignors to H. B. Fuller Licensing & Financing Inc., Wilmington, Del.**

**Filed Jun. 28, 1990, Ser. No. 546,022**

**Int. Cl.[5] A61F *13/15, 13/20*; C08L *15/00***

**U.S. Cl. 604—361** **7 Claims**

1. A disposable article for use as an infant diaper or adult incontinent pad comprising a film-backing sheet and an absorbent layer; wherein extruded to the film-backing sheet is a hot-melt moisture indicator composition which comprises:

(a) about 50 to 90 wt-% of a polyester reaction product between a copolymer of ethylene and an ethylenically unsaturated monomer having pendant carboxylic acid units, and a hydroxy compound of the formula $H(OCH_2CH_2)_nOH$, or $CH_3(OCH_2CH_2)_nOH$, wherein n is about 45 to 300;

(b) about 10 to 50 wt-% of a rosin acid compound having an acid number of at least about 140; and

(c) about 0.03 to 0.5 wt-% of an acid-base indicator that can change color at a pH of about 2 to 5.6.

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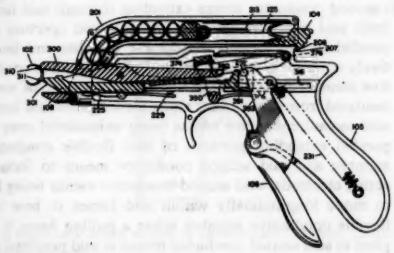
5,035,692

## HEMOSTASIS CLIP APPLICATOR

Russell R. Lyon, Ramona, Calif., and Alan S. Tash, Westland, Mich., assignors to Nicholas Herbert, Fullerton, Calif., a part interest

Filed Feb. 13, 1990, Ser. No. 479,512
Int. Cl.[5] A61B *17/00*
U.S. Cl. 606—143 33 Claims



1. A clip applicator comprising,
first housing means for storing a plurality of clips,
second housing means including jaw means which are selectively expandable,
said first housing means disposed in engagement with said second housing means and adapted to selectively supply individual clips to said jaw means whereby said clips can be selectively expanded by said jaw means, and
ramp means mounted in said second housing means,
said jaw means mounted in sliding relationship to said ramp means whereby said jaw means is selectively expanded.

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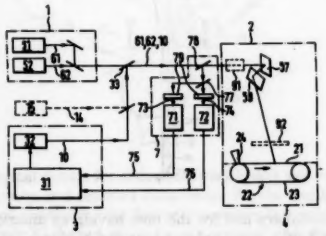
5,035,693

## DEVICE FOR SELECTIVE DESTRUCTION OF CELLS

Michael Kratzer, Leopoldstrasse 56, D-8000 Munchen 40, and Eberhard Unsöld, Dr. Hofmeisterstrasse 16a, D-8042 Oberscheissheim, both of Fed. Rep. of Germany

Filed Mar. 11, 1988, Ser. No. 167,211
Claims priority, application Fed. Rep. of Germany, Mar. 16, 1987, 3708511
Int. Cl.[5] A61M *5/01*
U.S. Cl. 606—12 13 Claims



1. A system for selective destructive or inactivation of cells, wherein planar arrays of cells are successively illuminated with a lower powered light beam produced by at least one light source and the radiation of particular cells responsive to said illumination enables a higher powered beam routed via a substantially common optical path to accomplish said destruction or inactivation in a near simultaneous manner, said system comprising:
(a) means defining an image plane for groups of cells;
(b) at least one laser light source for producing at least a first light beam to illuminate groups of cells positioned in said image plane;
(c) scanning means for directing said at least first light beam within said image plane to successively illuminate said groups of cells in the image plane;
(d) at least one optical detector for sensing predetermined radiations occurring from a particular cell of said groups of cells at a particular point of said scanning means in response to said illumination, and for producing at least one detector signal responsive to said sensed predetermined radiations;
(e) control means operating in response to said detector signal to enable a second light beam to be directed through said scanning means to said particular point, wherein the power level of said second light beam is sufficient to destroy or inactivate said particular cell;
(f) said control means effecting activation of said second light beam before said scanning means has moved appreciably from said particular point;
(g) said first light beam and said second light beam being formed by a single light source; and
(h) wherein said control means permits a single light beam to be switched from a low power harmless to cells to a higher power harmful to cells upon detector signal production wherein said scanning means comprises mirrors for deflecting said light beams in X-Y directions of a Cartesian coordinate system.

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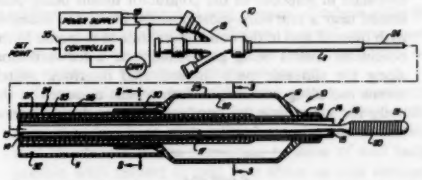
5,035,694

## DILATATION CATHETER ASSEMBLY WITH HEATED BALLOON

Daniel J. Kasprzyk; Jean C. Orth, both of Sunnyvale, and John W. Gaiser, Mountain View, all of Calif., assignors to Advanced Cardiovascular Systems, Inc., Santa Clara, Calif.

Filed May 15, 1989, Ser. No. 351,777
Int. Cl.[5] A61M *29/02*
U.S. Cl. 606—27 29 Claims

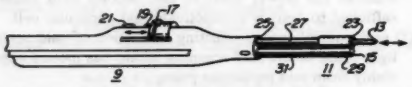


1. A balloon dilatation catheter having means to apply heat to atheroma within a patient's artery during the dilation thereof, the catheter comprising:
(a) an elongated tubular member which has an inflation lumen extending therein;
(b) a flexible, relatively inelastic inflatable balloon on a distal portion of the tubular member which is adapted to receive inflation fluid from the inflation lumen extending therein;
(c) a singular, electrically conductive pathway which is coextensive with a substantial part of the working portion of the balloon and in radially conductive heat transfer relationship therewith and which has two ends adapted to be connected to an electrical power source in order to pass electrical current therethrough;
(d) a source for electrical current at a frequency of at least about 100 kilohertz; and
(e) means connected to the two ends of the electrical conductive pathway to pass electrical current therethrough from the source to resistively heat the conductive pathway and thereby increase the temperature of the part of the working portion of the inflatable balloon which is coextensive with the electrically conductive pathway.

## 5,035,695
## EXTENDABLE ELECTROCAUTERY SURGERY APPARATUS AND METHOD

Jaroy Weber, Jr., 2630 Bear Gulch Rd., Woodside, Calif. 94062; Terrance L. Kloeckl, San Francisco, Calif.; Michael A. Kast, Palo Alto, Calif., and Frank T. Watkins, III, Menlo Park, Calif., assignors to Jaroy Weber, Jr., Woodside, Calif.

Division of Ser. No. 125,652, Nov. 30, 1987, Pat. No. 4,919,129.
This application Mar. 9, 1990, Ser. No. 491,568
The portion of the term of this patent subsequent to Apr. 24, 2007, has been disclaimed.
Int. Cl.[5] A61B *17/39*
U.S. Cl. 606—42 4 Claims




1. Surgical apparatus comprising:
an elongated body having a forward end and a rearward end;
conductor means for supplying electrical signal extending substantially through the body from near the rearward end to near the forward end thereof;
means within the body slidably supporting the conductor means for selective slideable positioning thereof between rearward-most and forward-most positions along a slideable path relative to said forward end;
slider means slideably disposed on the body and coupled to the conductor means for selectively altering the position thereof along the slideable path relative to said forward end; and
circuit mean including the conductor means for controlling the application of electrical signal thereto in response to the position of the conductor means along the slideable path thereof;
said circuit means including an interlock switch means operable in conductive state and in non-conductive state and disposed to be actuated for operation in the non-conductive state in response to the conductor means being positioned near a rearward-most position along the slideable path thereof, and in the conductive state in response to the conductor means being positioned near a forward-most along the slideable path thereof, said interlock switch means including auxiliary switch means disposed in the body for grounding the conductor means during operation in said non-conductive state.

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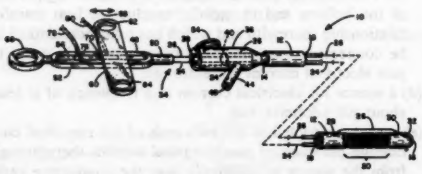
## 5,035,696
## ELECTROSURGICAL INSTRUMENT FOR CONDUCTING ENDOSCOPIC RETROGRADE SPHINCTEROTOMY

Mark A. Rydell, Golden Valley, Minn., assignor to Everest Medical Corporation, Minneapolis, Minn.

Filed Feb. 2, 1990, Ser. No. 474,481
Int. Cl.[5] A61B *17/39*
U.S. Cl. 606—47 13 Claims



1. A bipolar electrosurgical instrument for performing a sphincterotomy comprising:
(a) an elongated flexible plastic tubular member of a predetermined diameter having a proximal end, a distal end and at least one lumen extending between said proximal end and said distal end, said tubular member including an aperture extending through its wall into said lumen at a location proximate said distal end;
(b) a flexible conductive member with first and second ends and an outer diameter generally equal to said predetermined diameter coaxially affixed at said first end to said distal end of said plastic tubular member;
(c) first conductor means extending through said lumen from said proximal end to said distal end and electrically coupled to said flexible conductive member to create a return electrode; and
(d) second conductor means extending through said lumen from said proximal end, out through said aperture and parallel to said flexible conductive member and insulatively coupled to said second end of said flexible conductive member with said first and second conductor means insulated from one another along the length of said lumen, said second conductor means being uninsulated over the parallel extending portions of said flexible conductive member and said second conductor means to form an active electrode, said second conductor means being free to move longitudinally within said lumen to bow said flexible conductive member when a pulling force is applied to said second conductor means at said proximal end of said tubular member.

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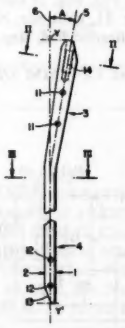
## 5,035,697
## ORTHOPEDIC MEDULLARY NAIL

Robert Frigg, Davos, Switzerland, assignor to Synthes (U.S.A.), Paoli, Pa.

Filed Jul. 3, 1990, Ser. No. 547,238
Claims priority, application Switzerland, Mar. 20, 1990, 914/90
Int. Cl.[5] A61B *17/58*
U.S. Cl. 606—67 14 Claims



1. A medullary nail for the tibia having an anterior half, a posterior half, a proximal end segment having a longitudinal axis, and a distal end segment having a longitudinal axis, the axes of the proximal and distal end segments meeting at an angle in the anterior-posterior plane of from about 5° to about 13°, the posterior and anterior halves of the proximal end segment being generally trigonal in cross section and the cross section of the proximal end segment, as a whole, being generally rhombic, the anterior half of the distal end segment being generally trigonal in cross section and the posterior half being generally semi-circular in cross section.

5,035,698

## ARCUATE OSTEOTOMY BLADE

John E. Comparetto, Cincinnati, Ohio, assignor to Ohio Medical Instrument Co., Inc., Cincinnati, Ohio

Division of Ser. No. 308,257, Feb. 8, 1989, Pat. No. 4,952,214, which is a continuation-in-part of Ser. No. 841,948, Mar. 20, 1986, abandoned, which is a continuation-in-part of Ser. No. 749,475, Jun. 27, 1985, Pat. No. 4,664,102, and a continuation-in-part of Ser. No. 721,640, Apr. 10, 1985, Pat. No. 4,708,133. This application Apr. 26, 1990, Ser. No. 514,735

Int. Cl.[5] A61B *17/14, 17/56*

U.S. Cl. 606—82 7 Claims

1. A bone saw blade which is cylindrically curved about an axis of curvature,

said blade having bone-cutting teeth along an edge thereof for cutting when said blade is reciprocated in a direction parallel to said axis of curvature,

said blade having a shank member attached to it which is parallel to said axis of curvature.

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5,035,699

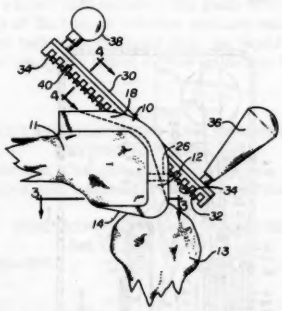
## PATELLA TRACK CUTTER AND GUIDE

Bradley J. Coates, Cordova, Tenn., assignor to Dow Corning Wright, Arlington, Tenn.

Filed Jan. 9, 1990, Ser. No. 462,268

Int. Cl.[5] A61F *5/04*

U.S. Cl. 606—86 10 Claims




1. A surgical device for accurately positioning and cutting a patellar groove in a resected distal femur for the implantation of a femoral prosthesis, said device comprising in combination:

a generally U-shaped guide having anterior and distal surfaces, adapted to fit over anterior, posterior and distal surfaces of the resected femur, including an elongated continuous central opening in the guide which is adapted to expose the central, distal and anterior resected aspects of the femur, the opening comprising lateral sides which define a pair of parallel curved tracks extending therealong the desired length of the patellar groove; and

a patella cutting tool having a track-engaging surface adapted to travel along the curved tracks and a cutting surface adapted to fit into the central opening for cutting or abrading the patellar groove into the exposed distal femur as the tool travels along the tracks.

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5,035,700

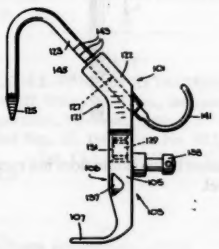
## PROSTHETIC KNEE JOINT WITH IMPROVED PATELLAR COMPONENT TRACKING

Robert V. Kenna, Hobe Sound, Fla., assignor to Pfizer Hospital Products Group, Inc., New York, N.Y.

Division of Ser. No. 151,747, Feb. 3, 1988, Pat. No. 4,944,756. This application Jul. 6, 1990, Ser. No. 549,517

Int. Cl.[5] A61F *2/32, 5/00*

U.S. Cl. 606—88 1 Claim




1. In combination:

a femoral drill jig comprising a base having a flat inner surface, an upper end and a lower end, a pair of skids extending inwardly from said base at the lower end thereof for placement between the resected posterior femoral condyles and tibial plateaus, and a plurality of drill holes extending through said base for forming femoral component fixation holes; and

a sizing gauge for indicating an appropriate femoral component size comprising a body portion and an elongated stylus slidably received within a bore in said body portion, said stylus being provided with a series of indicia along its length corresponding to different femoral component sizes and having an indicating tip for indicating a point on the surface of the anterior femoral cortex;

said femoral drill jig and said sizing gauge respectively including cooperating means for attachment of said body portion to said base adjacent the upper end of said base, said attachment means permitting rotation of said body portion with respect to said base about an axis substantially parallel to said inner surface.

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5,035,701

## DEVICE AND METHOD TO CHECK THE TENSION OF A SUTURE DURING A SURGICAL OPERATION

Jamil Kabbara, 29 avenue Franklin Roosevelt, 75008 Paris, France

Filed Dec. 15, 1989, Ser. No. 451,307

Claims priority, application France, Dec. 26, 1988, 8817180

Int. Cl.[5] A61B *17/00*

U.S. Cl. 606—148 13 Claims

1. Device to check the tension of a suture during a surgical operation, comprising a body (1), a gripping device (2, 3, 4) appropriate for gripping a suture, means (9, 10) to actuate the gripping device, and a means to signal that the stress resulting from the displacement of the body by the surgeon and the resistance opposed to this displacement by the tension of the suture held by the gripping device, exceeds a predetermined level;

and wherein the gripping device is mounted such that it

pivots with respect to the body, and an elastic return means prevents the gripping device from pivoting pro-

vided the tension of the suture does not exceed said predetermined level.

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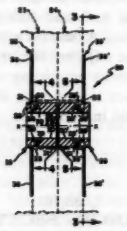
**5,035,702**

**METHOD AND APPARATUS FOR PROVIDING AN ANASTOMOSIS**

Syde A. Taheri, 268 Dan Troy, Williamsville, N.Y. 14221

Filed Jun. 18, 1990, Ser. No. 539,583
Int. Cl.[5] A61B *17/00*
U.S. Cl. 606—153 18 Claims



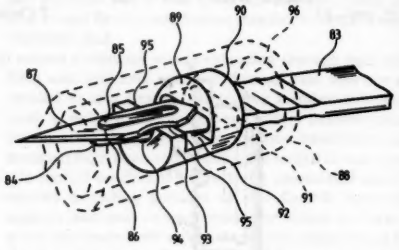
1. An anastomotic shunt, comprising:
an open-ended tubular male section;
an open-ended tubular female section;
each of said sections having a plurality of spokes, each of said spokes adapted to be moved between an extended position at which said spoke extends outwardly from the associated section, and a retracted position at which said spoke is positioned along side the associated section; and
joining means for joining said sections together so as to create a passageway therewithin;
whereby said sections may be positioned in an opening joining two tubular vessels and may be joined together with said spokes being in said extended positions to hold marginal portions of said vessels about said openings together to provide a shunt therebetween.

**5,035,703**

**DISPOSABLE SYRINGE NEEDLE AND SCALPEL HOLDER**

Morris J. Baskas, 200 California Rd. #14, Bronxville, N.Y. 10708

Continuation-in-part of Ser. No. 520,733, May 9, 1990, Pat. No. 4,995,870. This application Oct. 10, 1990, Ser. No. 595,238
Int. Cl.[5] A61M *5/32*
U.S. Cl. 606—167 8 Claims




1. A device for assisting in safely demounting of a blade having a slotted rear end from a scalpel handle comprising:
a hollow member for receiving and holding the scalpel when the blade end is inserted,
means connected to the hollow member for detaching the scalpel blade from its handle,
means for supporting the hollow member on a supporting surface.

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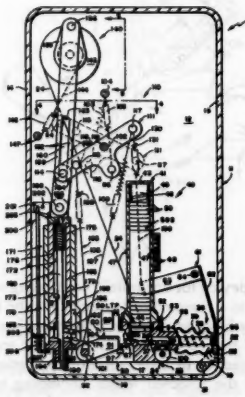
**5,035,704**

**BLOOD SAMPLING MECHANISM**

Robert D. Lambert, 110 North St., Larwill, Ind. 46746; Edward W. Eves, III, 8708 Cobblestone Pl., Fort Wayne, Ind. 46804, and Norbert L. Wyss, 4902 Stratford Rd., Fort Wayne, Ind. 46807

Filed Mar. 7, 1989, Ser. No. 320,251
Int. Cl.[5] A61B *17/32*
U.S. Cl. 606—182 70 Claims



1. A blood sampling mechanism comprising a test pad of a predetermined thickness set-off between opposite relatively closely spaced surfaces imparting a thin configuration to said test pad, said test pad carrying a dermis-piercing member having a pointed end, said pointed end being disposed inboard of said opposite surfaces, means for applying a force to said dermis-piercing member in a direction to move said pointed

end beyond one of said opposite surfaces to pierce the dermis and thereby obtain a blood sample, means for testing the blood sample, means for defining a blood sampling station at which the blood sample is obtained, means for defining a blood testing station at which the blood sample is tested by said blood sample testing means, and means for conveying said test pad from said blood sampling station after the blood sample has been obtained to said blood testing station.

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**5,035,705**

## METHOD OF PURGING A BALLOON CATHETER

**Matthew M. Burns, Minneapolis, Minn., assignor to SciMed Life Systems, Inc., Maple Grove, Minn.**

**Continuation-in-part of Ser. No. 297,078, Jan. 13, 1989, abandoned. This application Jul. 7, 1989, Ser. No. 376,619**

**Int. Cl.[5] A61M *29/02***

**U.S. Cl. 606—194** **8 Claims**

1. A method for preparing an over-the-wire balloon catheter for use prior to the introduction thereof into a patient, wherein the catheter has a shaft with a lumen extending longitudinally therethrough from a proximal end to a distal end, with the lumen having an inlet at the proximal end of the shaft, an outlet at the distal end of the shaft and at least one balloon inflation aperture therebetween, and wherein the catheter has an inflatable balloon about the shaft, with the lumen having its balloon inflation aperture in fluid communication with the interior of the balloon, the method comprising the sequential steps of:

filling the lumen with liquid from the proximal end of the shaft so that liquid is forced out of the lumen through the lumen outlet;

advancing a guide wire distally through the lumen until a distal end of the guide wire is past the balloon inflation aperture of the lumen;

forming a liquid-tight seal about the guide wire in the lumen distally of the balloon inflation aperture; and

filling the balloon with liquid after the liquid-tight seal is formed across the lumen to fully inflate the balloon.

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**5,035,706**

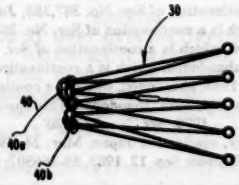
## PERCUTANEOUS STENT AND METHOD FOR RETRIEVAL THEREOF

**Cesare Giantureo, Champaign, Ill., and Thomas A. Osborne, Bloomington, Ind., assignors to Cook Incorporated, Bloomington, Ind.**

**Filed Oct. 17, 1989, Ser. No. 422,606**

**Int. Cl.[5] A61M *29/00***

**U.S. Cl. 606—198** **12 Claims**




1. A stent assembly comprising:

a first wire formed into a closed zig-zag configuration including;

an endless series of straight sections having opposite ends, said straight sections being joined by bends at said opposite ends to form a stent;

a set of eyes formed at several of said bends at one of said opposite ends; and

a thread passing through successive ones of said set of eyes, said thread including a pair of free ends trailing from said stent;

wherein said stent is resiliently contractable into a smaller first shape for conveyance through a body passageway;

wherein said one end of said stent is contractable by drawing said pair of free ends of said thread;

wherein said stent is resiliently expandable into a second shape in which the straight sections press against the walls of the body passageway; and

wherein said free ends are sufficiently long to extend outside the body passageway when said stent is situated within the passageway.

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**5,035,707**

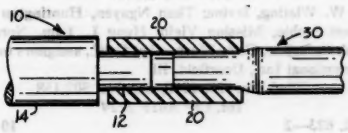
## NEEDLE-SUTURE ATTACHMENT

**Herbert W. Korthoff, Westport, Conn., assignor to United States Surgical Corporation, Norwalk, Conn.**

**Filed Sep. 27, 1989, Ser. No. 413,240**

**Int. Cl.[5] A61B *17/00***

**U.S. Cl. 606—224** **49 Claims**




17. A needle-suture attachment comprising:

(a) a needle having a shank of reduced cross-section;

(b) a suture; and

(c) a shrinkable tubing around said needle shank and a portion of said suture.

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**5,035,708**

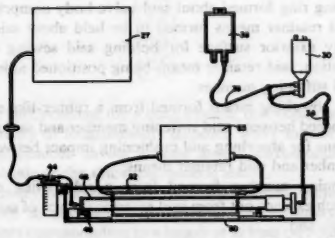
## ENDOTHELIAL CELL PROCUREMENT AND DEPOSITION KIT

**Paul G. Alchas, Wayne; Frank A. Augello, Cedar Knolls, both of N.J.; Christopher J. Brooks, Glen Cove, N.Y.; Tony A. Cutshall, Boonton, N.J.; Joseph A. DiPisa, Jr., Wyckoff, N.J.; Stuart K. Williams, Wilmington, Del.; Jonathan B. Gabel, Clifton, N.J.; Paul J. Mulhauser, New York, N.Y.; Wes Prais, Hewitt, N.J.; Bruce E. Jarrell, Philadelphia, and Deborah G. Rose, Warrington, both of Pa., assignors to Thomas Jefferson University, Philadelphia, Pa. and Becton, Franklin Lakes, N.J.**

**Continuation-in-part of Ser. No. 244,496, Sep. 12, 1988, which is a division of Ser. No. 742,086, Jun. 6, 1985, Pat. No. 4,820,626. This application May 24, 1989, Ser. No. 356,431**

**Int. Cl.[5] A61F *2/06***

**U.S. Cl. 623—1** **18 Claims**



1. An endothelial cell procurement and deposition kit for

collecting fat from a patient, processing said fat to produce an endothelial cell deposition product, and depositing said product on the surface of a graft, all under sterile conditions established and maintained within the components of said kit, comprising:

a fat collection means for collecting fat from a patient;

digestion means connectable to said fat collection means to maintain sterility during reception of said fat and for retaining said fat under sterile conditions during rinsing and digestion to produce a digested product;

endothelial cell isolation means connectable to said digestion means for maintaining sterile conditions during reception of said digested product and for separating and isolating microvessel endothelial cells from said digested product to produce an endothelial cell product; and

cell deposition means connectable to said isolation means for maintaining sterile conditions during reception of said endothelial cell product and for depositing said cells on the surface of a graft to be implanted in a patient and facilitating implantation of said endothelialized graft into a patient.

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**5,035,709**

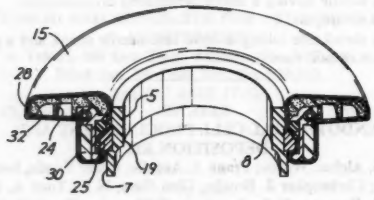
## MECHANICAL HEART VALVE WITH COMPLIANT SEWING RING

**David W. Wieting, Irvine; Than Nguyen, Huntington Beach; Robert Stobie, Mission Viejo; Hung L. Lam, Norco, and Ralph Kafesjian, Costa Mesa, all of Calif., assignors to Baxter International Inc., Deerfield, Ill.**

**Filed Mar. 29, 1990, Ser. No. 502,158**

**Int. Cl.[5] A61F *2/24***

**U.S. Cl. 623—2** **10 Claims**




1. A heart valve comprising:

a substantially cylindrically shaped valve body formed from an inelastic,. deformable material having a substantially circular first opening therethrough, an exterior wall, and an interior wall surrounding said first opening, said interior wall defining an annular ledge;

one or more occluders pivotally mounted to said interior wall within said first opening, said occluders being dimensioned to engage said annular ledge which restricts further pivoting action of said occluders;

stiffening member formed from a substantially nonresilient material fitted about said valve body exterior wall; and

a sewing ring formed about said valve body comprising:

a rigid retainer means formed to be held about said valve body exterior surface for holding said sewing ring in position, said retainer means being positioned adjacent to said stiffening member;

shock absorbing means formed from a rubber-like material disposed between said stiffening member and said retainer means for absorbing and cushioning impact between said member and said retainer means;

cushioning member formed from a rubber-like material which extends out from said exterior surface of said valve body; and

a length of fabric surrounding said sewing ring.

**5,035,710**

## BALLOON FOR AN INTRAOCULAR LENS AND PROCESSES FOR ITS PRODUCTION

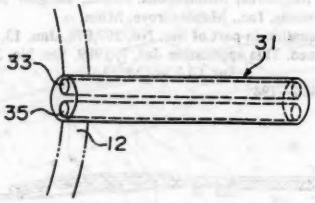
**Kazuhiko Nakada; Akihiro Yasuda, and Makoto Ichikawa, all of Nagoya, Japan, assignors to Menicon Co., Ltd., Nagoya, Japan**

**Filed Feb. 10, 1989, Ser. No. 308,533**

**Claims priority, application Japan, Feb. 12, 1988, 63-31582; Mar. 4, 1988, 63-52449**

**Int. Cl.[5] A61F *2/16***

**U.S. Cl. 623—6** **4 Claims**




1. A balloon for an intraocular lens capable of being inflated in a lens capsule to form an intraocular lens when a light transmitting injection material is injected into the balloon, which provides when inserted into the lens capsule a configuration corresponding substantially to the shape of the lens capsule, comprising:

a unitary elastic hollow body made of an elastomer and having a convex lenticular shape without projections along its circumference, said hollow body having a wall thickness of from 0.001 to 0.1 mm at its light transmitting central portion and a diameter of from 6 to 13 mm;

an inlet disposed on said hollow body providing an inlet for the injection of said injection material; and

an outlet disposed on said hollow body for discharging gas from said hollow body while said injection material is being injected into said hollow body;

wherein the inlet and the outlet are constituted by two pathways formed in one tube.

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**5,035,711**

## TRANSCUTANEOUSLY IMPLANTABLE ELEMENT

**Hideki Aoki, Ibaraki; Masaru Akao, Kawasaki, and Yoshiharu Shin, Higashimurayama, all of Japan, assignors to Kabushiki Kaisya Advance Kaihatsu Kenkyujo, Tokyo, Japan**

**Continuation of Ser. No. 470,414, Jan. 29, 1990, abandoned, which is a continuation of Ser. No. 387,388, Jul. 31, 1989, abandoned, which is a continuation of Ser. No. 267,613, Nov. 2, 1988, abandoned, which is a continuation of Ser. No. 110,539, Oct. 20, 1989, abandoned, which is a continuation of Ser. No. 917,247, Oct. 7, 1986, abandoned, which is a continuation of Ser. No. 592,436, Mar. 22, 1984, abandoned. This application Sep. 5, 1990, Ser. No. 577,820**

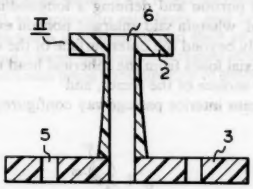
**Claims priority, application Japan, Mar. 24, 1983, 58-47896; Sep. 6, 1983, 58-162645; Sep. 12, 1983, 58-166502; Oct. 28, 1983, 58-200733**

**Int. Cl.[5] A61F *2/02***

**U.S. Cl. 623—11** **3 Claims**

1. A transcutaneously implantable element in which at least a portion thereof in contact with the cutaneous tissue of a

living body is composed of a ceramic material comprising, as the main raw material, hydroxyapatite, and which comprises a




through hole for mechanically connecting the interior and exterior of the living body to each other.

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**5,035,712**

## SELF-ADJUSTING PROSTHESIS ATTACHMENT

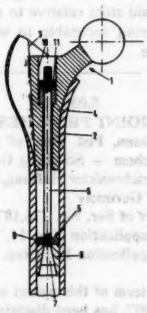
**Erik L. Hoffman, Roosendaal, Netherlands, assignor to Ordev B.V., Netherlands**

**Filed Jun. 12, 1990, Ser. No. 537,922**

**Claims priority, application Netherlands, Jun. 16, 1989, 8901526**

**Int. Cl.[5] A61F *2/28, 2/30, 2/36***

**U.S. Cl. 623—16** **13 Claims**



1. A tripartite set for securing a prosthesis (1) to a bone (2), namely,

a proximal part (4) connected to the prosthesis and adapted to be received in a complementarily processed part (3) of a marrow cavity;

a distal part or tip (5) to be fixed in said marrow cavity in an advanced position; and

a tie member (6) connecting said two parts, one end of said tie member extending at said tip and forming a wedge bolt or like member which expands upon the exercise of tensile force therewith, and said tie member being an at least axially resilient element with flat spring characteristics at least in the body temperature range.

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**5,035,713**

## SURGICAL IMPLANTS INCORPORATING RE-ENTRANT MATERIAL

**Elizabeth A. Friis, Wichita, Kans., assignor to Orthopaedic Research Institute, Inc., Wichita, Kans.**

**Filed Feb. 12, 1990, Ser. No. 478,433**

**Int. Cl.[5] A61F *2/28, 2/30, 2/36, 2/54***

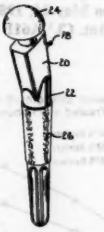
**U.S. Cl. 623—16** **8 Claims**

1. An orthopaedic device to be surgically implanted in living tissue to become functionally attached to said tissue, said device comprising:

a relatively rigid, load bearing body having a surface presenting a substrate;

a layer of re-entrant structure on said substrate in disposition for ingrowth of said tissue into the re-entrant structure for attaching the layer to the tissue,

said re-entrant structure comprising an open-cell material having a negative Poisson's ratio in at least one direction and under at least one mode of deformation and having a




plurality of interconnected, spaced apart ribs defining a plurality of cells, the ribs being partially buckled and at least some of said buckled ribs protruding inwardly of the cells; and

means fixedly securing the re-entrant structure layer to said substrate to effect attachment of the body to the tissue.

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**5,035,714**

## REINFORCEMENT FOR A BONE CEMENT BED

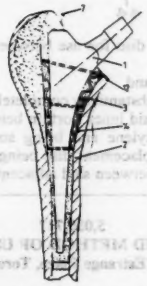
**Hans-Georg Willert, Göttingen, Fed. Rep. of Germany; Rudolf Koch, Berlingen, and Maxa Burgi, Pfyn, both of Switzerland, assignors to Sulzer Brothers Limited, Winterthur, Switzerland**

**Filed Jul. 16, 1990, Ser. No. 552,780**

**Claims priority, application Switzerland, Jul. 18, 1989, 2682/89-9**

**Int. Cl.[5] A61F *2/28, 2/36***

**U.S. Cl. 623—16** **17 Claims**



1. A reinforcement for a bone cement bed comprising

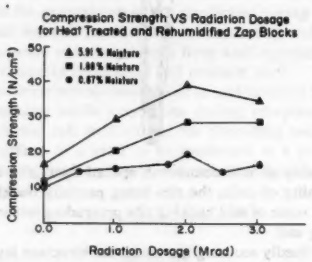
a plurality of longitudinally disposed wavy members, each said member having a crest height corresponding to a multiple of the thickness thereof; and

a plurality of transversely disposed crossing members secured to said wavy members at longitudinally spaced points corresponding to a length of at least two half-waves of a respective wavy member.

## 5,035,715
## GAMMA IRRADIATION OF COLLAGEN/MINERAL MIXTURES

Thomas L. Smestad, Palo Alto; Daniel Prowse, Los Gatos; George H. Chu, Cupertino, and Diana M. Hendricks, Brea, all of Calif., assignors to Collagen Corporation, Palo Alto, Calif.

Division of Ser. No. 928,306, Nov. 6, 1986, Pat. No. 4,865,602.
This application May 24, 1989, Ser. No. 356,453
Int. Cl.[5] A61F 2/28
U.S. Cl. 623—16 6 Claims

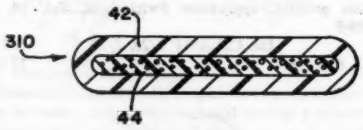

Compression Strength VS Radiation Dosage
for Heat Treated and Rehumidified Zap Blocks
Compression Strength (N/cm²)
Radiation Dosage (Mrad)

1. A biocompatible collagen/mineral composition which comprises a mixture containing 2–40% reconstituted fibrillar atelopeptide collagen and 60–98% calcium phosphate mineral by weight exclusive of moisture, which composition has a sterility assurance factor of at least as low as $10^{-6}$ and an additional characteristic selected from the group consisting of a compressive modulus of at least 10 N/cm$^2$ and a tensile strength of about 3–12 N/cm$^2$.

## 5,035,716
## REPLACEMENT DISC

Ernest L. Downey, 10559 S. Ave. G., Chicago, Ill. 60617

Continuation of Ser. No. 361,363, Jun. 5, 1989, abandoned, which is a division of Ser. No. 129,302, Dec. 7, 1987, Pat. No. 4,874,389. This application May 10, 1990, Ser. No. 522,076
Int. Cl.[5] A61F 2/02
U.S. Cl. 623—17 12 Claims




1. A replacement disc for use between adjacent vertebrae comprising:
an outer portion; and
an inner portion substantially completely surrounded by said outer portion, said inner portion being made of a flexible foamed polyethylene and being softer than said outer portion, said replacement disc being sized and shaped to fit the be held between said adjacent vertebrae.

## 5,035,717
## INSERT AND METHOD OF USING SAME

Peter J. Brooks, 3 L'Estrange Place, Toronto, Ontario, Canada M6S 4S6

Filed Sep. 26, 1988, Ser. No. 248,745
Claims priority, application Canada, May 12, 1988, 566572
Int. Cl.[5] A61F 2/32, 2/30
U.S. Cl. 623—18 19 Claims

1. A femoral insert system for a hip joint prothesis for use in a femur that has been cut across the femoral neck to form a resected surface, the insert system comprising:
a prothesis having an enlarged portion at a proximal end thereof: a generally spherical head member attachable to said enlarged portion; a stem having an outer surface extending from said enlarged portion to a distal end thereof, said stem having a bend located adjacent said enlarged portion and defining a longitudinal axis below said bend, wherein said enlarged portion extends radially outwardly beyond the outer surface of the stem for transferring axial loads from the spherical head member to the resected surface of the femur, and
a guide means interior passageway configured for slideably

housing said stem within said femur said guide means being securable to the femur below said resected surface, and said interior passageway and said stem, for at least a portion of said stem between said bend and said distal end, having mating axially non-interfering cross-sectional profiles to permit free axial movement of said stem along said longitudinal axis, and restricting rotational or toggling movement of said stem relative to said guide means, said guide means being securable to said femur below said resected surface.

## 5,035,718
## JOINT PROSTHESIS

Rütger Berchem, Essen, Fed. Rep. of Germany, assignor to Metalpraecis Berchem + Schaberg Gesellschaft fur Metallformgebung mit beschrankter Haftung, Gelsenkirchen-Uckendorf, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 276,187, Nov. 23, 1988, Pat. No. 4,955,912. This application Nov. 14, 1989, Ser. No. 436,323
Claims priority, application Fed. Rep. of Germany, Nov. 28, 1987, 3740438
The portion of the term of this patent subsequent to Sep. 11, 2007, has been disclaimed.
Int. Cl.[5] A61F 2/30
U.S. Cl. 623—18 3 Claims

1. A joint prosthesis, comprising:
an elongated shaft composed of metal and receivable in a marrow cavity of a femur adapted to form one side of a joint and having one end proximal to said joint and another end distal from said joint;

ball-joint means on said one end of said shaft adapted to engage in a socket formation; and

a layer of synthetic bone material covering at least said shaft for enabling bone tissue of the femur into which said shaft is inserted to grow into said layer, said layer having a greater thickness in regions of said shaft proximal to said one end and a lesser thickness in a region of said shaft, said greater thickness being a multiplicity of times greater than said lesser thickness, the synthetic bone material is hydroxyapatite and is sintered to said shaft, said shaft being composed of a titanium or cobalt-chromium alloy, said lesser thickness being about 0.2 mm and said greater thickness being about 10 to 30 times greater than said lesser thickness.

5,035,719

## MIDDLE DISTILLATE CONTAINING STORAGE STABILITY ADDITIVE

Rodney L. Sung, Fishkill, and Benjamin J. Kaufman, Hopewell Junction, both of N.Y., assignors to Texaco Inc., White Plains, N.Y.

Filed Dec. 27, 1988, Ser. No. 291,084
Int. Cl.[5] C10L 5/00
U.S. Cl. 44—334 9 Claims

1. A liquid middle distillate fuel composition comprising a major portion of a liquid middle distillate hydrocarbon fuel selected from the group consisting of kerosene, fuel oil, diesel oil, and Avjet fuel and a minor effective stabilizing portion of an additive consisting essentially of an acrylate polymer containing moieties derived from an N-heterocyclic amine.

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5,035,720

## COMPOSITION FOR INHIBITION OF CORROSION IN FUEL SYSTEMS, AND METHODS FOR USE AND PREPARATION THEREOF

Jerry J. Weers, Ballwin, Mo., assignor to Petrolite Corporation, St. Louis, Mo.

Continuation-in-part of Ser. No. 159,861, Feb. 24, 1988, abandoned. This application Oct. 3, 1988, Ser. No. 252,301
Int. Cl.[5] C10L 5/00
U.S. Cl. 44—343 19 Claims

1. A petroleum-based fuel composition of reduced tendency to corrode copper and aluminum surfaces contacted by the fuel composition, comprising a petroleum-based fuel and a corrosion inhibiting amount of oil-soluble adduct of a triazole and a basic nitrogen compound selected from the group consisting of polyamines, alkoxyamines, aryloxyamines and aryloxyamines, said adduct being resistant to extraction from an oil phase to a water phase.

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5,035,721

## METHOD FOR BENEFICIATION OF LOW-RANK COAL

Linda Atherton, Los Altos, Calif., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Mar. 30, 1989, Ser. No. 330,424
Int. Cl.[5] C10L 9/08, 9/00
U.S. Cl. 44—594 10 Claims

1. A method for moisture removal and improvement of handling and storage characteristics of a low-rank coal comprising the steps of

(a) demoisturizing low-rank feed coal by a process whereby removal of moisture from said coal causes the outer surfaces of said coal to be rendered essentially hydrophobic thereby forming a mixture comprising hydrophobic surface-modified bulk coal and fines;

(b) separating said surface-modified bulk coal from said fines in said mixture, said fines comprising finely divided coal particles, ash and pyrite;

(c) forming an aqueous slurry of said fines;

(d) mixing said aqueous slurry with 2 to 15% by weight of a hydrocarbon oil to form coal agglomerates in said slurry;

(e) separating said agglomerates from said slurry.

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5,035,722

## METHOD OF EXTRACTING COAL FROM A COAL REFUSE PILE

Paul M. Yavorsky, Monongahela, Pa., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Sep. 18, 1989, Ser. No. 408,586
Int. Cl.[5] C10L 5/00, 9/06
U.S. Cl. 44—605 14 Claims

1. A method of extracting coal from a coal refuse pile, comprising

(a) soaking the coal refuse pile with an aqueous alkali solution;

(b) distributing an oxygen-containing gas throughout the coal refuse pile for a time period sufficient to effect oxidation of coal contained in the coal refuse pile;

(c) leaching the coal refuse pile with an aqueous alkali solution to solubilize and extract the oxidized coal as alkali salts of humic acids; and

(d) collecting the resulting solution containing the alkali salts of humic acids, wherein said method is conducted at ambient pressure.

13. A method as defined by claim 1, further comprising adding calcium hydroxide to the resulting solution containing alkali salts of humic acids to produce precipitated calcium humates and an alkali solution.

14. A method as defined by claim 13, further comprising collecting the precipitated calcium humates from the alkali solution.

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5,035,723

## BONDED ABRASIVE PRODUCTS CONTAINING SINTERED SOL GEL ALUMINA ABRASIVE FILAMENTS

Paul W. Kalinowski, Boylston; Muni S. Ramakrishnan, Northboro; Charles V. Rue, Petersham; David A. Sheldon, Worcester, and Brian E. Swanson, Northboro, all of Mass., assignors to Norton Company, Worcester, Mass.

Filed Apr. 28, 1989, Ser. No. 345,153
Int. Cl.[5] B24D 3/02
U.S. Cl. 51—309 25 Claims

1. A bonded abrasive product comprised of a sintered sol gel filament shaped alumina based abrasive and a bond therefor wherein said filament shaped alumina based abrasive has an average aspect ratio of at least 1.5, a hardness of at least 16 GPa, and is comprised predominantly of sintered alpha alumina crystals having a size of less than about 2 microns.

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5,035,724

## SOL-GEL ALUMINA SHAPED BODIES

Vimal K. Pukari, Northborough; Norman I. Paille, Jr., Oxford; Thomas P. Thibaudeau, Dudley, and Arup K. Khaund, Worcester, all of Mass., assignors to Norton Company, Worcester, Mass.

Filed May 9, 1990, Ser. No. 521,296
Int. Cl.[5] B24D 3/02
U.S. Cl. 51—309 28 Claims

17. A method of forming an alpha-alumina grinding wheel comprising the steps of (1) adding to a sol-gel alumina hydrate a drying control additive selected from the group consisting of agarose gels, formamide, and whiskers and chopped fibers of a material which is non-reactive with the alumina hydrate, (2) forming the sol-gel alumina hydrate gel into the shape of a grinding wheel, (3) removing water from the shape and (4) firing the shape to convert the alumina hydrate into alpha alumina and produce the grinding wheel.

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5,035,725

## COMPOSITE MONOLITHIC FREE ABRASIVE GRINDING LAP AND A METHOD OF MAKING THE SAME

Pinke Halpert, West Palm Beach, and Royce Platt, Okeechobee, both of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Continuation-in-part of Ser. No. 320,204, Mar. 7, 1989, Pat. No. 4,975,225. This application Dec. 4, 1990, Ser. No. 624,787
Int. Cl.[5] B24D 3/08, 3/16
U.S. Cl. 51—293 3 Claims

1. A method of manufacturing a composite yet monolithic, free abrasive grinding lap, comprising the steps of

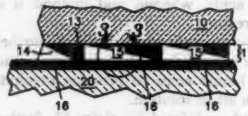
forming an initial preform, including filling a mold cavity with a dense slip constituted of ceramic or metal particles in mixture with a liquid medium;

freezing the initial preform;

freeze-drying the initial preform to remove the liquid medium therefrom;

sintering the thus obtained dry preform only to such an

extent that the larger ones of the particles are fused together but leave interconnected pores therebetween; and converting the thus obtained porous matrix preform into the lap, including bringing the porous matrix preform to a temperature above the melting point of silicon, and contacting the porous matrix preform with a quantity of molten silicon in such a manner that such molten silicon penetrates into the pores of the porous matrix preform at least to an extent needed to substantially completely fill the pores of an effective region of the lap that is to come in contact with a workpiece to be acted upon by the lap.



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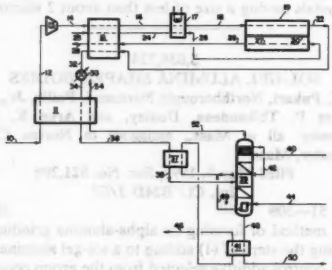
**5,035,726**

## PROCESS FOR REMOVING OXYGEN FROM CRUDE ARGON

**Michael S. Chen, Zionsville, and Philip J. Cook, Schnecksville, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.**

**Filed May 24, 1990, Ser. No. 528,997**
**Int. Cl.[5] B01D** *53/22, 71/02*
**U.S. Cl. 55—16** **14 Claims**



1. A process for purifying bulk argon which comprises recovering a crude bulk argon gas containing oxygen from a cryogenic, adsorptive or membrane separation of air, heating the crude argon gas to a temperature of from about 450° to 800° C. and compressing the crude argon gas to a pressure of about 30 to 80 psig, feeding the heated, compressed gas to a high temperature solid electrolyte membrane selective to the permeation of oxygen over other components of the gas, and separating oxygen from the argon gas by selective permeation of oxygen through the membrane.

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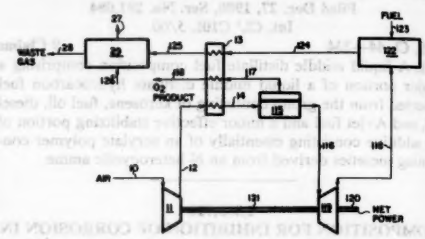
**5,035,727**

## OXYGEN EXTRACTION FROM EXTERNALLY FIRED GAS TURBINES

**Michael S. Chen, Zionsville, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.**

**Filed May 24, 1990, Ser. No. 534,987**
**Int. Cl.[5] B01D** *53/22, 71/02*
**U.S. Cl. 55—16** **10 Claims**

1. A process for recovering oxygen from an externally fired power generating gas turbine system in which a hot, compressed air stream from a compressor is expanded through a turbine expander to generate power, which process comprises compressing air to make a hot, compressed air stream, further heating the air stream from the compressor with a hot combustion effluent from an external combustor, passing the hot, compressed air from the compressor over the feed side of a solid electrolyte membrane selective to the permeation of oxygen over other components of the air, maintaining a positive oxygen ionic potential on the membrane to separate oxygen from the air stream by situating the membrane between two electrodes positioned to apply external voltage across the membrane surface, removing oxygen from the permeate side of the membrane before expanding the residual air through the turbine expander to generate power and combusting the air expanded through the turbine expander with fuel in the external combustor and feeding the hot combustion effluent to a heat exchanger to further heat the hot compressed air stream.



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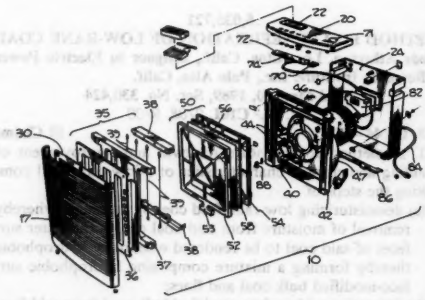
**5,035,728**

## AIR CLEANER ASSEMBLY

**Roger C. Fang, Alhambra, Calif., assignor to Tatung Company of America, Inc., Long Beach, Calif.**

**Filed Jul. 16, 1990, Ser. No. 552,906**
**Int. Cl.[5] B03C** *3/68*
**U.S. Cl. 55—106** **4 Claims**



1. An electrically energized air cleaner comprising:

a housing of generally box-shaped configuration, having a front side with an air intake grill, a back side arranged to be placed against a wall, and a top plate with a fresh air outlet therein;

a mechanical pre-filter screen mounted within said housing adjacent said air intake grill;

an electrostatic precipitator mounted within said housing on the inner side of said mechanical pre-filter screen;

a motor and fan assembly mounted within said housing adjacent said back side of the housing;

a main filter cartridge mounted within said housing between said electrostatic precipitator and said motor and fan assembly, said main filter cartridge being easily removable by withdrawing it from the bottom of said housing, and including

(a) a synthetic mesh media made of non-conductive fiber with electrical charges embedded therein; and

(b) a plastic screen impregnated with activated carbon powder;

at least one ionizing needle charged at a negative electrical

potential, positioned within said housing below said fresh air outlet and within the pathway of fresh air being discharged;

an air quality sensing device mounted in said housing in communication with outside air and having coupled therewith an adjustable control for selecting a level of air quality to be achieved; and

an automatic control located in said top plate and cooperatively coupled with said air quality sensing device so as to keep the motor, electrostatic precipitator, and ionizing needle energized so long as room air sampled by said sensing device does not meet the selected air quality level.

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**5,035,729**

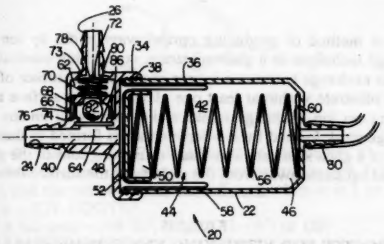
## LIQUID SEPARATION AND RECOVERY APPARATUS FOR FUEL TANK VENT LINE

**David H. Hodgkins, Modesto, Calif., assignor to Parker Hannifin Corporation, Cleveland, Ohio**

**Continuation-in-part of Ser. No. 596,201, Oct. 11, 1990, Pat. No. 5,019,141. This application Feb. 1, 1991, Ser. No. 650,396**

**Int. Cl.[5] B01D** *19/00*

**U.S. Cl. 55—168** **19 Claims**




1. Apparatus for preventing the discharge of a liquid through a vent line from a tank containing said liquid while enabling vapor to pass therethrough, comprising:

a body, said body including an inlet and an outlet, the inlet in fluid communication with the vent line from said tank and the outlet in fluid communication with atmosphere,

said body further including expandable chamber means in fluid communication with said inlet and said outlet for expanding and contracting in area in proportion to fluid pressure;

vapor valve means adjacent said outlet for enabling vapor to pass therethrough while preventing the passage of liquid;

whereby when liquid is delivered to said apparatus through said vent line said liquid is prevented from passing through said apparatus by said vapor valve means and said liquid held in said body increases said fluid pressure which expands the area of said expandable chamber means and is held therein until said fluid pressure falls and said liquid is expelled from said expandable chamber means.

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**5,035,730**

## MIST RECOVERY APPARATUS WITH TWISTED STRIP INSERTED PIPES

**Takayasu Kisaragi, Tokyo, and Yuichi Shirasaka, Aichi, both of Japan, assignors to Sumitomo Light Metal Industries, Ltd., Tokyo, Japan**

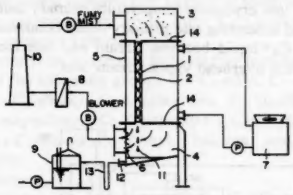
**Filed Jun. 19, 1990, Ser. No. 540,090**

**Claims priority, application Japan, Jun. 23, 1989, 1-73007[U]**

**Int. Cl.[5] B01D** *45/16*

**U.S. Cl. 55—269** **2 Claims**

1. A mist recovery apparatus comprising a shell, an upper pipe plate and a lower pipe plate respectively arranged in said shell, and a plurality of exhaust passing pipes, each pipe having a twisted strip placed therein, wherein an exhaust gas containing the mist is passed downward through said exhaust passing pipes so as to separate and recover said mist from said exhaust gas, the inner diameter of said exhaust passing pipe being 25–60 mm, and said twisted strip having a ratio of L/P (length of said




exhaust passing pipe/twisting half pitch of said twisted strip) of 8–35.

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**5,035,731**

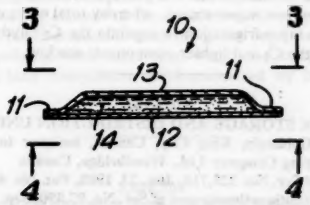
## DEVICE FOR CONTROLLING RELATIVE HUMIDITY WITHIN A SUBSTANTIALLY SEALED CONTAINER

**David B. Spruill; Joseph L. Banyasz, and Thomas V. Van Auken, all of Richmond, Va., assignors to Philip Morris Management Corp., Richmond, Va.**

**Continuation-in-part of Ser. No. 483,976, Feb. 20, 1990, which is a continuation of Ser. No. 254,566, Oct. 7, 1988, abandoned. This application Mar. 30, 1990, Ser. No. 502,505**

**Int. Cl.[5] B01D** *53/02*

**U.S. Cl. 55—387** **26 Claims**




1. A device for insertion into a substantially sealed container for maintaining in said container, at substantially all times after sealing, a desired relative humidity, said device comprising:

a buffering substance capable of maintaining said desired relative humidity by liberating water vapor when actual relative humidity falls below said desired relative humidity and by absorbing water vapor when actual relative humidity rises above said desired relative humidity, said buffering substance further having a relative humidity temperature dependency similar to a food or tobacco product contained in said substantially sealed container; and

a means of enclosure for containing said buffering substance and allowing said liberation and absorption of water vapor.

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**5,035,732**

## CRYOGENIC SEPARATION OF GASEOUS MIXTURES

**Richard H. McCue, Jr., Houston, Tex., assignor to Stone & Webster Engineering Corporation, Boston, Mass.**

**Filed Jan. 4, 1990, Ser. No. 462,395**

**Int. Cl.[5] F25J** *3/02*

**U.S. Cl. 62—24** **44 Claims**

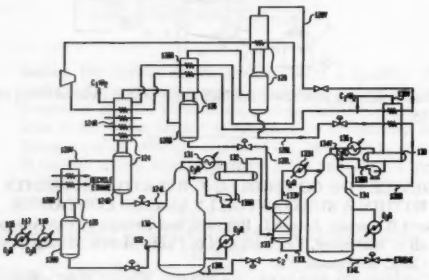
1. A cryogenic separation process for recovering $C_2$ hydrocarbons from a hydrocarbon feedstream comprising methane, ethene and ethane, said process comprising:

(a) introducing said hydrocarbon feedstream into a dephlegmation zone at cryogenic temperatures;

(b) dephlegmating said hydrocarbon feedstream into a primary methane-rich gas stream and a primary liquid con-

densate stream rich in $C_2$+hydrocarbon components and containing a minor amount of methane;

(c) passing said primary liquid condensate stream to a moderately low cryogenic temperature primary demethanizer unit and separating said primary liquid condensate stream into a $C_2$+liquid bottoms stream and intermediate methane-rich overhead vapor stream; and



(d) further separating said intermediate methane-rich overhead vapor stream from the moderately low cryogenic temperature primary demethanizer unit in an ultra-low temperature final demethanizer unit operating below about 175 psia to recover a first liquid ethene-rich hydrocarbon product stream and a final demethanizer ultra-low temperature vapor stream; whereby total energy requirements for refrigeration to separate the $C_2$+hydrocarbon from the $C_1$ and lighter components are low.

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**5,035,733**

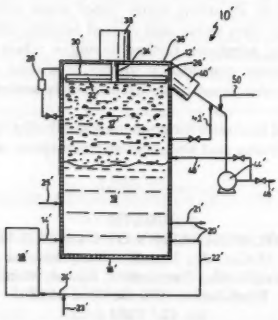
## ICE STORAGE AND DISTRIBUTION UNIT

**Vladimir Goldstein, King City, Canada, assignor to Sunwell Engineering Company Ltd., Woodbridge, Canada**

**Division of Ser. No. 225,711, Jun. 23, 1988, Pat. No. 4,912,935, which is a continuation-in-part of Ser. No. 97,890, Sep. 17, 1987, abandoned, which is a continuation-in-part of Ser. No. 74,834, Jul. 17, 1987, abandoned. This application Mar. 16, 1990, Ser. No. 494,661**

**Int. Cl.[5] B01D *9/04***

**U.S. Cl. 62—541** **27 Claims**



1. A method of storing and distributing ice comprising the steps of:

introducing an inlet slurry of fine particulate ice and solution into a separation zone;

allowing the slurry to separate into an ice bed and a liquid bath in said separation zone;

agitating said ice bed in an agitation zone;

discharging agitated ice from said agitation zone;

monitoring the level of said ice bed in said agitation zone; and

introducing makeup liquid into one of said separation and agitation zones to maintain the level of said ice bed at a predetermined level in said agitation zone.

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**5,035,734**

## METHOD OF PRODUCING OPTICAL WAVEGUIDES

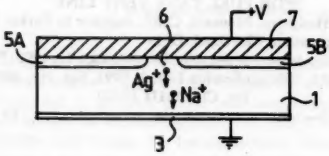
**Seppo Honkanen; Simo Tammela, and Ari Tervonen, all of Espoo, Finland, assignors to Oy Nokia Ab**

**Filed Apr. 12, 1990, Ser. No. 507,781**

**Claims priority, application Finland, Apr. 13, 1989, 891767**

**Int. Cl.[5] C03C *21/00***

**U.S. Cl. 65—30.13** **7 Claims**




1. A method of producing optical waveguides by ion exchange technique in a glass substrate, comprising conducting an ion exchange between a source of ions and a surface of the glass substrate within at least one glass substrate surface area having no ion exchange mask, while employing an ion exchange mask formed by ion-depleted areas formed in the surface of a glass substrate as a result of moving ions in the glass of said substrate away from the vicinity of the surface thereof.

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**5,035,735**

## PROCESS FOR VITRIFYING ENVIRONMENTALLY HAZARDOUS WASTE MATERIAL IN A GLASS MELTING FURNACE

**Helmut Pieper; Hartmut Zschocher, both of Lohr, and Helmut Sorg, Glattbach, all of Fed. Rep. of Germany, assignors to Beteiligungen Sorg GmbH & Co. KG, Lohr, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 303,841, Jan. 30, 1989, Pat. No. 4,948,411. This application Dec. 13, 1989, Ser. No. 450,346**

**Claims priority, application Fed. Rep. of Germany, Dec. 13, 1988, 3841918; Feb. 3, 1989, 3903194; Apr. 14, 1989, 3912311**

**Int. Cl.[5] C03B *5/16***

**U.S. Cl. 65—134** **16 Claims**

1. Process for vitrifying environmentally hazardous waste material in a glass melting furnace, comprising:

forming a glass melt having a surface in the furnace;

forming a batch containing the waste material and an additive consisting of at least one compound selected from the group consisting of phonolite and $SiO_2$ containing materials;

adding the batch to the furnace so that a batch layer is formed on the molten glass;

heating the molten glass after the batch layer is formed thereon, solely by devices in the molten glass;

producing a gall layer of glass gall on the surface of the glass melt between the glass melt and the batch layer, said glass gall consisting essentially of at least one of an alkali salt and an alkaline earth salt;

withdrawing glass gall from the gall layer as necessary and controlling the composition, supply, and distribution of the batch so that the gall layer and the batch layer are maintained at respective thicknesses which are sufficient to maintain the furnace atmosphere above the batch layer at a sufficiently low temperature so that substantially all of the condensable components which emerge from the molten glass and the gall layer condense in the batch layer; and

withdrawing the molten glass from the furnace via a first outlet means.

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**5,035,736**

## HERBICIDES WHICH CONTAIN 2-(4-HETARYLOXY)- OR 2-(4-ARYLOXY)-PHENOXYACETIC OR -PROPIONIC ACID DERIVATIVES AND/OR CYCLOHEXENONE DERIVATIVES AS HERBICIDAL ACTIVE INGREDIENTS AND NAPHTHALENE DERIVATIVES AS ANTIDOTES AND FOR CONTROLLING PLANT GROWTH

**Helmut Hagen, Frankenthal; Juergen Pfister, Speyer; Ulrich Eichenauer, Frankfurt; Bruno Wuerzer, Otterstadt; Wilfried Helbig, Neustadt, and Karl-Otto Westphalen, Speyer, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

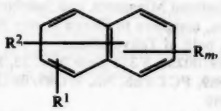
**Filed Oct. 31, 1989, Ser. No. 429,763**

**Claims priority, application Fed. Rep. of Germany, Nov. 9, 1988, 3837926**

**Int. Cl.[5] A01N *31/04***

**U.S. Cl. 71—98** **12 Claims**

1. Herbicidal composition containing, as antagonistic agent, at least one naphthalene derivative of the formula I



I

where

R is $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkylthio, $C_1$–$C_4$-haloalkyl, $C_1$–$C_4$-alkoxy, halogen, hydroxyl, nitro or benzyl, m is 0, 1, 2 or 3, and the radical R may be different when m is 2 or 3,

$R^1$ is —CN, C(X)$YR^3$,

$R^2$ is halogen; —$NR^5R^6$; —N=CH—$R^5$; or OH

$R^3$ is hydrogen or

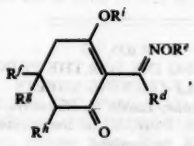
$C_1$–$C_6$-alkyl which may carry from one to three of the following substituents: halogen, $C_1$–$C_4$-alkylamino, di-($C_1$–$C_4$-alkyl)amino, $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-alkylthio, phenyl or

phenyl which may carry from one to three of the following substituents: halogen, $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-alkylthio, $C_1$–$C_4$-haloalkyl, cyano and/or nitro;

$R^6$ is hydrogen or

$C_1$–$C_6$-alkyl which may carry from one to three of the following substituents: halogen, $C_1$–$C_4$-alkylamino, di-($C_1$–$C_4$-alkyl)amino, $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-alkylthio and-/or phenyl;

and at least one herbicidal active ingredient from the group consisting of the cyclohexenone derivatives of the formula III



III

where

$R^d$ is $C_1$–$C_4$-alkyl,

$R^e$ is $C_1$–$C_4$-alkyl, $C_3$–$C_4$-alkenyl, $C_3$–$C_4$-alkynyl, $C_3$- or $C_4$-haloalkylene or

thenyl which may be substituted by halogen,

$R^f$ is $C_1$–$C_4$-alkyl which may be monosubstituted by $C_1$–$C_4$-alkylthio or $C_1$–$C_4$-alkoxy,

a 5-membered or 6-membered saturated or monounsaturated ring system which, in addition to carbon members, may contain an oxygen or sulfur atom, and the sulfur atom may carry one or two oxygen atoms and this ring may carry up to three of the following radicals: hydroxy, halogen, $C_1$–$C_4$-alkyl, $C_1$–$C_4$-haloalkyl, $C_1$–$C_4$-alkoxy and/or $C_1$–$C_4$-alkylthio;

a 10-membered saturated or monounsaturated heterocyclic structure which contains two oxygen or sulfur atoms and may be substituted by up to three $C_1$–$C_4$-alkyl groups and/or methoxy groups,

phenyl, pyridyl or isoxazolyl, and this ring may carry up to three of the following groups: $C_1$–$C_4$-alkyl, $C_1$–$C_4$haloalkyl, $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-alkylthio, $C_3$–$C_6$-alkenyloxy, $C_3$–$C_6$-alkynyloxy, $C_1$–$C_4$-alkoxy-$C_1$–$C_3$-alkyl, $C_1$–$C_4$-dialkoxy-$C_1$–$C_3$-alkyl, formyl, halogen and/or benzoylamino

$R^g$ is hydrogen,

$R^h$ is hydrogen, cyano, halogen or $C_1$–$C_4$-alkoxycarbonyl and

$R^i$ is hydrogen or one equivalent of an environmentally compatible cation.

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**5,035,737**

## HERBICIDE COMPOSITIONS

**Donald C. Young, Fullerton, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.**

**Continuation of Ser. No. 783,368, Oct. 3, 1985, abandoned, which is a division of Ser. No. 453,496, Dec. 27, 1982, Pat. No. 4,910,179. This application Oct. 18, 1989, Ser. No. 423,682**

**Int. Cl.[5] A01N *59/00***

**U.S. Cl. 71—83** **16 Claims**

1. A composition comprising a solution containing a herbicidally effective amount of the monourea adduct of sulfuric acid and a member selected from the group consisting of surfactants, polar solvents other than water, and combinations thereof, which composition is characterized by herbicidal activity.

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**5,035,738**

## AMINOPROPYLMORPHOLINE SALTS, COMPOSITIONS AND USES THEREOF

**Johnny L. Burns, Chicago, Ill., and Richard Wilson, Corpus Christi, Tex., assignors to Sandoz Ltd., Basle, Switzerland**

**Filed Dec. 23, 1988, Ser. No. 289,165**

**Int. Cl.[5] C07D *295/13***

**U.S. Cl. 71—88** **6 Claims**

1. A compound which is an N-aminopropylmorpholine salt (APM) of a herbicidally active compound selected from the group consisting of:

glyphosate,

2-methyl-4-chlorophenoxyacetic acid (MCPA),

3,6-dichloro-2-methoxy-benzoic acid (dicamba), and

2,4-dichlorophenoxyacetic acid (2,4-D).

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**5,035,739**

## TRIFLUOROMETHANESULFONAMIDE DERIVATIVE AND A HERBICIDE CONTAINING THE SAME

**Mitsuru Shibata; Yoshiyuki Hiramatsu; Ryoichi Adachi, and Kenichiro Mitsutake, all of Chiba, Japan, assignors to Idemitsu Kosan Company Limited, Tokyo, Japan**

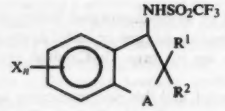
**Division of Ser. No. 254,935, Sep. 6, 1988, Pat. No. 4,919,705. This application Jan. 26, 1990, Ser. No. 471,108**

**Claims priority, application Japan, Feb. 10, 1987, 62-27127; Jul. 27, 1987, 62-185380**

**Int. Cl.[5] A01N *43/16, 43/18*; C07D *309/14, 335/06***

**U.S. Cl. 71—91** **30 Claims**

2. A herbicide comprising a carrier and a trifluoromethanesulfonamide compound represented by the formula



wherein X is a hydrogen atom, a halogen atom, an alkyl group having 1 to 4 carbon atoms or a haloalkyl group having 1 to 4 carbon atoms, n is 1, 2, or 3 and A is —O—$CR^3R^4$—, —S—$CR^3R^4$—, —SO—$CR^3R^4$— or —$SO_2$—$CR^3R^4$— and $R^1$, $R^2$, $R^3$ and $R^4$ are each a hydrogen atom or an alkyl group having 1 to 4 carbon atoms.

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**5,035,740**

**HERBICIDAL COMPOUNDS**

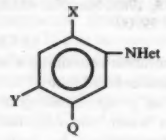
**Kathleen M. Poss, Lawrenceville, N.J., assignor to FMC Corporation, Philadelphia, Pa.**

**Filed May 16, 1989, Ser. No. 352,794**

**Int. Cl.[5] C07D *253/06*; A01N *43/707***

**U.S. Cl. 71—93** **30 Claims**

1. A herbicidal compound of the formula



in which Q is —$CR^1(R^2)C(R^3)(R^4)Q'$ or —$CR^1$=$C(R^4)Q'$;

$R^1$, $R^2$ and $R^3$ are each, independently, hydrogen, halogen, or lower alkyl;

$R^4$ is hydrogen or lower alkyl;

Q' is —COOH, —COOZ, —$COOR^5$, —$CON(R^6)(R^7)$, —CHO or —$C(O)R^5$;

Z is a salt-forming cation;

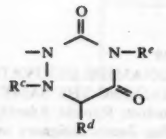
$R^5$ is alkyl, cycloalkyl, benzyl, halobenzyl, alkylbenzyl or haloalkylbenzyl;

each of $R^6$ and $R^7$ is, independently, hydrogen, alkyl, cycloalkyl, alkenyl, alkynyl, alkoxy, phenyl, benzyl, or $SO_2R^8$ or is one of said radicals substituted by halogen, alkyl, or cyano, $R^8$ being the same as $R^6$ other than hydrogen or $SO_2R^8$;

X is hydrogen, halogen, alkyl, haloalkyl, alkoxy, or nitro;

Y is hydrogen, halogen, alkyl, alkoxy, haloalkyl, haloalkylsulfinyl, haloalkoxy, or alkylthio;

NHet is a monovalent nitrogen-containing group of the formula



in which $R^c$ and $R^d$ are each H or together constitute a double bond and $R^e$ is alkyl or haloalkyl; and

in which any alkyl, alkenyl, alkynyl or alkylene moiety has up to about 6 carbon atoms and any cycloalkyl group has from about 3 to 6 carbon atoms.

11. A herbicidal composition comprising a herbicidally effective amount of the compound of claim 1 in admixture with a suitable carrier.

**5,035,741**

**FATTY ACID BASED EMULSIFIABLE CONCENTRATE HAVING HERBICIDAL ACTIVITY**

**George S. Puritch, Saanichton; Roderick Bradbury, Sidney, and Wenda Mason, Brentwood Bay, all of Canada, assignors to Safer, Inc., Newton, Mass.**

**Filed Oct. 13, 1989, Ser. No. 421,376**

**Int. Cl.[5] A01N *37/02***

**U.S. Cl. 71—113** **12 Claims**

1. An environmentally compatible, non-selective herbicidal composition, suitable for emulsification in water prior to use, consisting essentially of:

a herbicidally effective amount of a monocarboxylic fatty acid component of at least two fatty acids selected from the group consisting of caprylic, pelargonic, capric, undecanoic and lauric acids;

an emulsifier component; and

an oil component selected from the group consisting of triglyceridies, terpenoids and paraffinic mineral oils.

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**5,035,742**

**REDUCED CHROMIUM-ORE BEARING POWDER AND METHOD FOR PRODUCING THE SAME**

**Tadashi Uemura; Tsutomu Minagawa, and Sadahiro Saito, all of Yamaguchi, Japan, assignors to Showa Denko K.K. and Shunan Denko K.K., both of Tokyo, Japan**

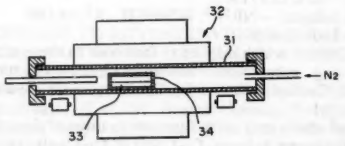
**PCT No. PCT/JP89/00256, § 371 Date Nov. 13, 1989, § 102(e) Date Nov. 13, 1989, PCT Pub. No. WO89/08724, PCT Pub. Date Sep. 21, 1989**

**PCT Filed Mar. 9, 1989, Ser. No. 444,162**

**Claims priority, application Japan, Mar. 14, 1988, 63-59880**

**Int. Cl.[5] B01J *2/04***

**U.S. Cl. 75—623** **8 Claims**




1. A reduced chromium-ore bearing powder used for production of a chromium-containing steel in a converter, which powder essentially consists of a reduced-chromium ore, and free carbon, wherein said reduced chromium-ore essentially consists of an acid-soluble chromium, a chromium oxide, an acid-soluble iron, an iron oxide, and gangue material, and, further said reduced chromium-ore powder has 3 mm or less of particle diameter, said acid-soluble chromium is in an amount of 85% or more of the total chromium, and said acid-soluble iron is in an amount of 95% or more of the total iron.

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**5,035,743**

**DESENSITIZING INK FOR THE PRINTING OF SELF-COPYING SHEETS**

**Albert Amon, Lausanne; Laszlo K. Boksanyi, La Conversion, and Pierre Degott, Pully, all of Switzerland, assignors to SICPA Holding SA, Switzerland**

**Filed Feb. 15, 1989, Ser. No. 311,616**

**Claims priority, application Switzerland, Feb. 16, 1988, 553/88**

**Int. Cl.[5] C09D *11/00***

**U.S. Cl. 106—21** **20 Claims**

1. A desensitizing ink for dry or humid offset, typographic or flexographic printing on a surface of a chemical copying set comprising at least two superimposed sheets whose facing surfaces are covered with an electrophilic layer and a nucleophilic layer, respectively, adapted for a chromogenic reaction upon the application of local pressure, wherein said ink contains an active desensitizing agent comprising at least one

nucleophilic compound comprising the addition product of a mono, di or polyisocyanate and an ethoxylated derivative or propoxylated derivative or mixture of ethoxylated and propoxylated derivatives of a primary or secondary mono, di or polyamine or of an alkanolamine, wherein the hydroxyl functionality of the derivative has been reduced after alkoxylation to a value of from 0.5 to 2 by etherification, esterification, or urethanisation.

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5,035,744

## ELECTROLESS GOLD PLATING SOLUTION

Koji Nishiyama; Masayuki Yamazaki; Takeshi Tsukuda, and Youtaro Arai, all of Saitama, Japan, assignors to Kojima Chemicals Co., Ltd., Tokyo, Japan

Filed Jul. 9, 1990, Ser. No. 550,305

Claims priority, application Japan, Jul. 12, 1989, 69-177984

Int. Cl.[5] C23C *18/44*

U.S. Cl. 106—1.23 8 Claims

1. In an electroless gold plating solution comprising water-soluble gold salts, pH controlling agents, catalysts, alkylamine boranes, alkali cyanides and ethylenediamine tetraacetic acid, an improvement wherein: 0.1 to 10 ml/l of ethyleneamines and 0.1 to 10 g/l of hexamethylenetetramine are contained as complexing agents in said solution.

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5,035,745

## ION-EXCHANGED ABRASION RESISTANT COATINGS

Chia-Cheng Lin, Gibsonia; John D. Basil, Pittsburgh, and Robert M. Hunia, Kittanning, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jun. 29, 1990, Ser. No. 546,076

Int. Cl.[5] C09K *3/00;* C04B *14/00*

U.S. Cl. 106—287.16 18 Claims

1. An optically transparent coating composition for protecting a substrate from ultraviolet radiation comprising an ion-exchanged reaction mixture which comprises

a. a partially hydrolyzed alkoxide of the general formula $R_xM(OR')_{z-x}$ wherein R is an organic radical, M is selected from the group consisting of silicon, aluminum, titanium, zirconium and mixtures thereof, R' is a low molecular weight alkyl radical, z is the valence of M and x is less than z and may be zero; and

b. a colloidal oxide selected from the group consisting of silica and cerium oxide and mixtures thereof.

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5,035,746

## BIEGE-BROWN ENCAPSULATED PIGMENTS AND METHOD OF THEIR PRODUCTION

Dietrich Speer, Hanau; Akos Kiss, Wasserlos, and Peter Kleinschmit, Hanau, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Filed Mar. 2, 1990, Ser. No. 487,148

Claims priority, application Fed. Rep. of Germany, Mar. 3, 1989, 3906821

Int. Cl.[5] C09C *1/62*

U.S. Cl. 106—438 13 Claims

1. Beige-brown encapsulated pigments consisting essentially of transparent crystals of zirconium silicate in which there is included, as a discrete phase within said zirconium silicate, crystalline iron titanate of the composition $Fe_2TiO_5$ as a colored compound.

5,035,747

## MIXED CRYSTAL PIGMENTS OF THE ANTHANTHRONE SERIES, AND PREPARATION AND USE THEREOF

Erwin Dietz, Kelkheim, and Manfred Urban, Wiesbaden, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

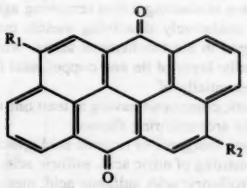
Filed Dec. 22, 1989, Ser. No. 455,499

Claims priority, application Fed. Rep. of Germany, Dec. 28, 1988, 3844063

Int. Cl.[5] C09B *48/00, 3/50*

U.S. Cl. 106—495 10 Claims

1. A mixed crystal pigment of the anthanthrone series formed from two or more compounds of the general formula I



I

where $R_1$ and $R_2$ are each hydrogen, chlorine, bromine, iodine, nitro, cyano, amino, hydroxyl, $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy, aryloxy, which may be halogen-substituted, or $C_1$–$C_4$-alkyl-substituted, $C_1$–$C_4$-alkylsulfonyl, benzylsulfonyl, which may be halogen-substituted, or $C_1$–$C_4$-alkyl-substituted, acetoxy, anilino, which may be halogen-substituted, $C_1$–$C_4$-alkyl-substituted or haloalkyl-substituted, naphthindonylamino or phthalimido, wherein each component may be present in an amount of from 1 to 99%, and $R_1$ and $R_2$ may be identical or different.

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5,035,748

## STORAGE-STABLE INORGANIC PIGMENTS CONTAINING SPECIFIC POLYORGANOSILOXANES WITH LONG CHAIN ARYL AND/OR ALKYL GROUPS

Wilfried Burow, Krefeld; Jürgen Kischkewitz, Ratingen, and Ottfried Schlak, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Nov. 22, 1989, Ser. No. 440,619

Claims priority, application Fed. Rep. of Germany, Dec. 13, 1988, 3841848

Int. Cl.[5] C08K *5/54;* C04B *20/10*

U.S. Cl. 106—499 7 Claims

1. A coated inorganic pigment comprising at least 0.1% by weight and at most 5% by weight of one or more polyorganosiloxanes, wherein the polyorganosiloxanes have viscosities of 10 to 100,000 mPa.s and a relative molecular weight of 500 to 500,000, have no reactive or crosslinking groups, contain at least one $C_9$–$C_{25}$ Si-alkyl and/or one $C_9$–$C_{25}$ Si-aryl group per molecule, the total content of these groups in the polyorganosiloxane being 7 to 70 by weight and the other organic radicals contained in the polyorganosiloxane having 1 to 8 carbon atoms.

5,035,749

## PROCESS FOR REMOVING TIN AND TIN-LEAD ALLOY FROM COPPER SUBSTRATES

Takashi Haruta; Takaharu Nagano, both of Amagasaki; Takeyoshi Kishimoto, Yamatokoriyama; Yasushi Yamada, Osaka, and Tomoko Yuno, Suita, all of Japan, assignors to MEC Co., Ltd., Hyogo, Japan

Filed Aug. 6, 1990, Ser. No. 563,197
Claims priority, application Japan, Aug. 18, 1989, 1-211497
Int. Cl.[5] C23G 1/00
U.S. Cl. 134—2 3 Claims

1. A process for removing a layer of tin or tin-lead alloy from the surface of a copper substrate on which the tin and tin-lead alloy layer has been formed, which comprises the steps of:

(1) dissolving the layer of tin or tin-lead alloy by exposure to a first solution containing a first removing agent which is capable of oxidatively dissolving metals more reactive than hydrogen in electrochemical series, while retaining an intermetallic layer of tin and copper, said first solution consisting essentially of

(a) an aromatic compound having at least one nitro substituent in the aromatic ring thereof,

(b) at least one inorganic or organic acid selected from the group consisting of nitric acid, sulfuric acid, borofluoric acid, hydrofluoric acid, sulfamic acid, methane sulfonic acid, glycolic acid, lactic acid and acetic acid, and

(c) at least one compound which liberates a halogen atom or a halogen-containing complex ion in an acidic solution selected from the group consisting of hydrochloric acid, ammonium chloride, sodium chloride, ammonium fluoride, potassium bromide, fluorotitanates, and fluoroaluminates;

(2) dissolving the remaining intermetallic layer of tin and copper by exposure to a second solution containing a second removing agent which is capable of oxidatively dissolving metals less reactive than hydrogen in electrochemical series, thus causing the copper substrate to be exposed.

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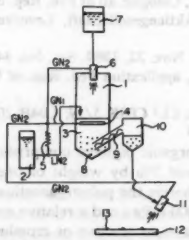
5,035,750

## PROCESSING METHOD FOR SEMICONDUCTOR WAFERS

Masuo Tada, Yao; Takeki Hata, Kobe; Takaaki Fukumoto, and Toshiaki Ohmori, both of Itami, all of Japan, assignors to Taiyo Sanso Co., Ltd. and Mitsubishi Denki Kabushiki Kaisha, both of, Japan

Division of Ser. No. 177,784, Apr. 5, 1988, Pat. No. 4,932,168. This application Jan. 25, 1990, Ser. No. 470,372
Claims priority, application Japan, Jun. 23, 1987, 62-156061; Dec. 11, 1987, 62-313667
Int. Cl.[5] B08B 7/02; H01L 21/304
U.S. Cl. 134—7 19 Claims




1. A method of cleaning a semiconductor wafer comprising:

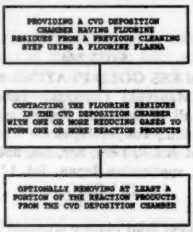
blasting ice particles formed from ultrapure water containing carbon dioxide gas and having a specific resistance no more than 1 megohm-cm at a surface of a semiconductor wafer.

5,035,751

## CLEANING METHOD FOR SEMICONDUCTOR WAFER PROCESSING APPARATUS

Makoto Nagashima, Machida; Naoaki Kobayashi, Sakura, both of Japan, and Jerry Wong, Fremont, Calif., assignors to Applied Materials, Inc., Santa Clara, Calif.

Filed Sep. 22, 1989, Ser. No. 411,433
Int. Cl.[5] B44C 1/22
U.S. Cl. 134—22.1 20 Claims


PROVIDING A CVD DEPOSITION CHAMBER HAVING FLUORINE RESIDUES FROM A PREVIOUS CLEANING STEP USING A FLUORINE PLASMA
CONTACTING THE FLUORINE RESIDUES IN THE CVD DEPOSITION CHAMBER WITH ONE OR MORE REDUCING GASES TO FORM ONE OR MORE REACTION PRODUCTS
OPTIONALLY REMOVING AT LEAST A PORTION OF THE REACTION PRODUCTS FROM THE CVD DEPOSITION CHAMBER

1. An improvement in a method for cleaning a chemical vapor deposition (CVD) deposition chamber in a semiconductor wafer processing apparatus which comprises contacting fluorine residues remaining therein from a plasma fluorine cleaning step with one or more reducing gases.

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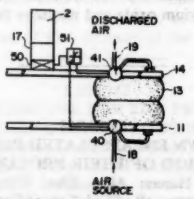
5,035,752

## METHOD FOR PROCESSING A VIBRATORY SURFACE

Katsumasa Tanaka; Hitoshi Satoh; Heijiro Kawakami, all of Kobe, and Nobuaki Marukawa, Toyonaka, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Jun. 20, 1990, Ser. No. 540,700
Claims priority, application Japan, Feb. 1, 1990, 2-24133
Int. Cl.[5] B08B 1/02, 3/10
U.S. Cl. 134—32 4 Claims




1. A method for processing a vibratory surface of an object to be processed, comprising the steps of:

hanging the object on a hook,

supporting said hook by a supporting frame having an air spring;

immersing the object hung on the hook in a surface treatment tub containing a processing liquid,

automatically adjusting the height of the air spring to a suitable standard height in response to the detected weight of the processed object, and

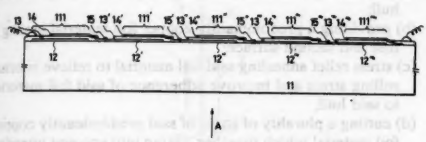
thereafter vibrating the surface so as to treat the object.

5,035,753

## PHOTOELECTRIC CONVERSION DEVICE

Kunio Suzuki, Tokyo; Masayoshi Abe, Tama; Mikio Kinka, Nonichimachi; Yasuyuki Arai, Atsugi; Akemi Satake, Yokohama; Kazuo Nishi, Sagamihara; Shuichi Kugawa, Atsugi, and Noriya Ishida, Asahikawa, all of Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan

Filed Dec. 22, 1989, Ser. No. 453,310
Claims priority, application Japan, Dec. 27, 1988, 63-335632
Int. Cl.[5] H01L *31/042, 31/075*
U.S. Cl. 136—249 11 Claims



10. A photoelectric conversion device comprising:

a substrate; and

a plurality of photoelectric conversion elements formed on said substrate and connected in series to each other, wherein each element comprises at least one pin junction, wherein a lowermost semiconductor layer of one of said elements is directly connected to an uppermost semiconductor layer of another element adjacent thereto.

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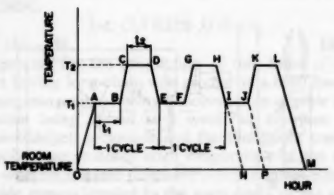
5,035,754

## HEAT TREATING METHOD FOR HIGH STRENGTH ALUMINUM ALLOY

Tetsuo Sakiyama; Seishi Tsuyama, and Kuninori Minakawa, all of Kawasaki, Japan, assignors to NKK Corporation, Tokyo, Japan

Filed Apr. 4, 1990, Ser. No. 504,255
Claims priority, application Japan, Apr. 14, 1989, 1-94794
Int. Cl.[5] C21D *1/00;* C22C *21/06*
U.S. Cl. 148—159 19 Claims




1. A heat treating method for high strength aluminium alloy comprising the steps of;

(1) solution heat treating an aluminium alloy consisting essentialy of about 3 to 9 wt. % Zn, 1 to 6 wt. % Mg, 1 to 3 wt. % Cu, at least one element selected from the group consisting of 0.1 to 0.5 wt.% Cr, 0.1 to 0.5 wt.% Zr, 0.2 to 1.0 wt.% Mn, and the balance Al,

(2) heating the solution heat treated alloy to a temperature of a lower temperature zone of from 100° to 140° C. and optionally maintaining said alloy at a temperature within said lower temperature zone for a duration of time,

(3) reheating of the alloy to a temperature of an upper temperature zone of from 160° to 200° C. and optionally maintaining said alloy at a temperature within said upper temperature zone for a second duration of time,

(4) cooling of the alloy to a temperature of the lower temperature zone, and

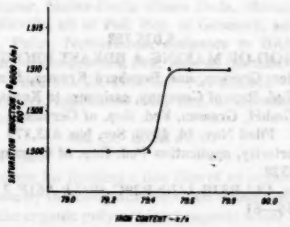
(5) repeating the steps (2), (3), and (4) at least twice.

5,035,755

## AMORPHOUS METAL ALLOYS HAVING ENHANCED AC MAGNETIC PROPERTIES AT ELEVATED TEMPERATURES

Davidson M. Nathasingh, Stanhope; Ronald J. J. Martis, East Hanover, and Amitava Datta, Morris Township, Morris County, all of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Continuation of Ser. No. 384,900, Jul. 24, 1989, abandoned, which is a continuation of Ser. No. 120,242, Nov. 12, 1987, abandoned, which is a continuation of Ser. No. 883,870, Jul. 14, 1986, abandoned, which is a continuation of Ser. No. 641,145, Aug. 16, 1984, abandoned, which is a continuation of Ser. No. 613,118, May 23, 1984, abandoned. This application Dec. 11, 1990, Ser. No. 627,606
Int. Cl.[5] C22C *38/02*
U.S. Cl. 148—304 6 Claims



1. A metal alloy which is at least 90% amorphous consisting essentially of a composition having the formula $Fe_aSi_bB_c$ wherein "a", "b" and "c" are atomic percentages ranging from about 79.4 to 79.8, 6 to 8 and 12 to 14, respectively, with the proviso that the sum of "a", "b" and "c" equals 100, said alloy having a power loss of less than about 0.3 W/kg, measured at 60 Hz and 1.4T at 100° C., and an exciting power not greater than about 0.47 VA/kg, measured at 60 Hz and 1.4% at 100° C.

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5,035,756

## BONDING AGENTS FOR THERMITE COMPOSITIONS

Josephine Covino, Ridgecrest, Calif., assignor to United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 10, 1989, Ser. No. 296,162
Int. Cl.[5] C06B *33/00*
U.S. Cl. 149—37 9 Claims

1. A mixture having thermic reaction properties for use in venting ordnance case walls during aviation fuel fires, comprising:

a mixture of aluminum powders in the range of H-3 to H-60;

an oxide of iron powder; and

a bonding agent that ignites the mixture at low temperature.

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5,035,757

## AZIDE-FREE GAS GENERANT COMPOSITION WITH EASILY FILTERABLE COMBUSTION PRODUCTS

Donald R. Poole, Woodinville, Wash., assignor to Automotive Systems Laboratory, Inc., Farmington Hills, Mich.

Filed Oct. 25, 1990, Ser. No. 603,469
Int. Cl.[5] C06B *31/28*
U.S. Cl. 149—46 15 Claims

1. A pyrotechnic, combustion filterable slag-particles forming gas generating mixture useful for inflating an automobile or aircraft safety crash bag, said pyrotechnic mixture comprising at least one material of each of the following functional groups of materials:

a. A fuel selected from the group of azole compounds consisting of triazole aminotetrazole, tetrazole, bitetrazole and metal salts of these compounds,

b. An oxygen containing oxidizer compound selected from

the group consisting of alkali metal, alkaline earth metal, lanthanide and ammonium nitrates and perchlorates or from the group consisting of alkali metal and alkaline earth metal chlorates and peroxides,

c. A high temperature slag forming material selected from the group consisting of alkaline earth metal oxides, hydroxides, cabonates, and oxalates,

d. A low-temperature slag forming material which is sufficient in amount during combustion to cause the solid combustion particles to coalesce into easily filterable slag or clinkers but not so much as to make a low viscosity liquid, selected from the group consisting of silicon dioxide, boric oxide and vanadium pentoxide or from the group consisting of alkali metal silicates, borates, and carbonates or from the group consisting of naturally occurring clays and talcs.

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**5,035,758**

## METHOD OF MAKING A BREAST PROSTHESIS

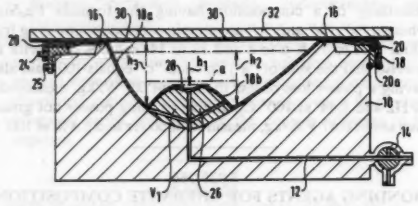
**Peter Degler, Grassau, and Bernhard Kramer, Marquartstein, both of Fed. Rep. of Germany, assignors to Kunststofftechnik Debler GmbH, Grassau, Fed. Rep. of Germany**

**Filed Nov. 14, 1990, Ser. No. 613,179**

**Claims priority, application Fed. Rep. of Germany, Nov. 17, 1989, 3938328**

**Int. Cl.[5] B32B *1/10*; B29C *39/12*; A61F *2/52***

**U.S. Cl. 156—61** **10 Claims**



1. Process for producing a breast prosthesis having a concave recess facing the human body from a synthetic resin composition that can be cured to a gelatinous consistency in a heated mold including a female die and a cooperating male die and that is enclosed between first and second thermoplastic films, the method comprising the steps of:

a. clamping a first film which defines a side of the prothesis facing away from the human body to the female die, heating and deep drawing the first film to permanently conform it to the contour of the female die;

b. removing the deep-drawn first film from the female die;

c. placing an insert into the female die, the insert having a volume and a free area which correspond to the volume and a free area of the concave recess facing the human body;

d. positioning the deep-drawn first film in the female die and in conformance with the insert;

e. thereafter filling the positioned deep-drawn first film in the female die to about an edge of the die with the synthetic resin composition;

f. covering the synthetic resin composition with a second film and welding together the first and second films along their entire overlapping edges;

g. removing the insert from the female die the first film again taking the contour of the female die;

h. permanently imparting to the second film the concave recess with a corresponding contour of the male die; and

i. curing the synthetic resin composition to produce the breast prosthesis.

**5,035,759**

## METHOD OF PROTECTING HULLS OF MARINE VESSELS FROM FOULING

**Graham C. Andoe, Fort Lauderdale, Fla., assignor to Andoe, Inc., Atlanta, Ga.**

**Filed Sep. 19, 1989, Ser. No. 409,071**

**The portion of the term of this patent subsequent to Sep. 20, 2005, has been disclaimed.**

**Int. Cl.[5] B29C *53/04*; G01B *3/12, 5/20***

**U.S. Cl. 156—64** **24 Claims**

1. A method of protecting a hull of a marine vessel from fouling, including the steps of:

(a) measuring the surface configuration and shape of the hull;

(b) providing a predominantly copper foil material having a first and second surface;

(c) stress relief annealing said foil material to relieve internal rolling stress and improve adherence of said foil material to said hull;

(d) cutting a plurality of strips of said predominantly copper foil material which together, taking into account intended strip overlap, correspond to said surface configuration, said hull including at least one structure thereon made of a metal of dissimilar composition from the composition of said foil material;

(e) applying said strips of foil material to said hull in adjacent relation, in any, while maintaining isolation of said foil material from said at least one structure by physically spacing said foil material from said at least one structure so that currents are not conducted therebetween;

(f) smoothing said strips of foil material on said hull with a smoothing device; and

(g) rolling a roller device over said strips of foil to adhere said strips of foil to said hull and to eliminate bubbles therefrom.

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**5,035,760**

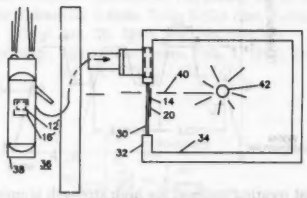
## METHOD OF INDICATING A LOCATION

**James P. Sirianno, R.D. #6, Buffalo St. Ext., Jamestown, N.Y. 14701**

**Filed Dec. 26, 1989, Ser. No. 456,524**

**Int. Cl.[5] B44F *1/00*; B32B *31/00***

**U.S. Cl. 156—67** **9 Claims**



1. A method of using a film to indicate a delivery location comprising the steps of:

releasably affixing said film having indicia thereon to an exterior surface of a first container to be delivered;

delivering the first container to said delivery location;

detaching said film from the first container;

affixing said film to a planar glass member; and subsequently

delivering a second container to said delivery location.

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**5,035,761**

## METHOD FOR CROSS-SECTIONING YARN SAMPLES

**Robert F. Hempton, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.**

**Filed Nov. 30, 1989, Ser. No. 443,372**

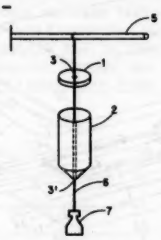
**Int. Cl.[5] B32B *31/00***

**U.S. Cl. 156—161** **4 Claims**

1. A method for cross-sectioning a yarn of one or more

filaments perpendicular to the yarn's longitudinal axis using a lidded embedding capsule having a longitudinal axis, two ends, and a hollow cavity between the ends, the lid being at one end of the capsule and having a hole therein of a diameter corresponding to the diameter of the yarn to be sectioned, said method comprising the steps of:

(a) making a hole in the end of the capsule opposite the lid, said hole forming an axis with the hole in the lid in substantially parallel alignment with the axis of the capsule;




(b) passing one end of the yarn through the hole in the lid, the hollow cavity, and the hole in the opposite end so that the one or more filaments are in substantially parallel alignment with the longitudinal axis of the capsule;

(c) tensioning the yarn to straighten and position the one or more filaments and substantially remove any crimp;

(d) forming a solid mass having a longitudinal axis inside the capsule to fix the position of the tensioned yarn; and

(e) cross-sectioning the solid mass perpendicular to its longitudinal axis.

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**5,035,762**

## PRODUCTION OF THIN FILMS

**Gerhard Wegner, Mainz-Drais, Fed. Rep. of Germany; Arend J. Schouten, Peize, Netherlands; Gisela Duda, Mainz, and Thomas Arndt, Ingelheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

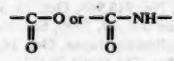
**Filed Jul. 22, 1988, Ser. No. 223,017**

**Claims priority, application Fed. Rep. of Germany, Jul. 24, 1987, 3724543**

**Int. Cl.[5] B32B *31/04***

**U.S. Cl. 156—230** **13 Claims**

1. A process for the production of thin films of organic polymers having long-chain side groups on a solid base material, the organic polymer being dissolved in an organic solvent, the solution being spread at a water/air interface by the Langmuir-Blodgett technique and the film being transferred onto a solid base material after evaporation of the organic solvent, wherein organic polymers which contain long-chain n-alkyl side groups bonded to the main chain of the polymer exclusively via




groups are used as the organic polymers having long-chain side groups, and in which some of these long-chain n-alkyl side groups are replaced by shorter-chain n-alkyl side groups, by branched alkyl side groups having the same number or a smaller number of carbon atoms as the main chain or by equally long or shorter side groups having one or more C—C multiple bonds, wherein the organic polymer used is a copolymer of

(a) polymerized units of an ethylenically unsaturated compound containing n-alkyl ester groups, where the alkyl radical of the ester group is of not less than 12 carbon atoms, and

(b) polymerized units of one or more further ethylenically unsaturated compounds which differ from (a) and contain alkyl ester groups, the alkyl radical of the ester groups having a smaller number of carbon atoms than that of (a), being branched or containing one or more C—C multiple bonds,

or the organic polymer used is a polycondensate which contains two or more different ester or ether side groups, one of the ester or ether groups having an alkyl radical with a smaller number of carbon atoms, a branch or one or more C—C multiple bonds, which polycondensate has a helical structure.

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**5,035,763**

## PREPARATION OF THIN FILMS

**Gerhard Wegner, Mainz-Drais; Gisela Duda, Mainz; Christoph Bubeck, Eltville, all of Fed. Rep. of Germany, and Arend J. Schouten, Peize, Netherlands, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Jul. 22, 1988, Ser. No. 223,018**

**Claims priority, application Fed. Rep. of Germany, Jul. 24, 1987, 3724542**

**Int. Cl.[5] B32B *31/04***

**U.S. Cl. 156—230** **20 Claims**

1. In a process for forming a thin film of an organic polymer on a solid base by the Langmuir-Blodgett technique, wherein a solution of the organic polymer in an organic water-immiscible solvent is spread at a water/air interface as a thin film, the solvent is evaporated and the film is transferred to the solid base, the improvement which comprises: including in the solution to be spread at the water/air interface an olephilic dye having no ionic groups, whereby a thin film is formed on the base having a defined concentration of dye per unit area.

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**5,035,764**

## COHESIVE FINISHES FOR COMPOSITE MATERIALS

**Larry D. Blake, Ogden, Utah, assignor to Wasatch Fiber Group, Inc., Ogden, Utah**

**Filed Aug. 28, 1987, Ser. No. 90,620**

**Int. Cl.[5] C09J *5/00*; B32B *33/00***

**U.S. Cl. 156—327** **45 Claims**

1. A method of providing a decorative finish to an article containing resin comprising:

applying a decorative sheet, through which sheet resin may pass, to a surface of an article containing resin;

holding the sheet in compressive contact with the article; while

curing the resin within the resin-containing article so that a sufficient amount of the resin exudes from the resin-containing article and passes through the sheet so as to form an exterior shell of cured resin enveloping the decorative sheet and the article and allowing the decorative finish to be visible.

5,035,765

## INSTALLATION FOR ETCHING OBJECTS

Rainer Haas, Herrenberg, Fed. Rep. of Germany, assignor to Hans Hollmuller Maschinenbau GmbH & Co, Fed. Rep. of Germany

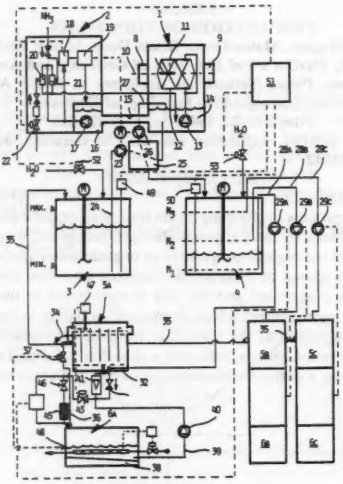
PCT No. PCT/EP89/01345, § 371 Date Jul. 20, 1990, § 102(e) Date Jul. 20, 1990, PCT Pub. No. WO90/05797, PCT Pub. Date May 31, 1990

PCT Filed Nov. 10, 1989, Ser. No. 543,826

Claims priority, application Fed. Rep. of Germany, Nov. 24, 1988, 3839651

Int. Cl.[5] B44C *1/22*; C23F *1/00*

U.S. Cl. 156—345 10 Claims



1. Installation for etching objects, in particular printed circuit boards, with

a) at least one etching machine, in which metal is etched from the objects, the etching medium being enriched with metal;

b) at least one electrolytic cell, in which enriched etching medium is depleted;

c) at least one electronic control circuit, which controls the exchange of etching medium between the etching machine and the electrolytic cell so that the density of the etching medium in the etching machine is substantially constant,

characterised by

d) at least one further electrolytic cell (*5b*, 5c), which is connected in parallel with the first electrolytic cell (*5a*);

e) a device (4, *28a*, *28b*, *28c*, *29a*, *29b*, *29c*), which

ea) measures the quantity of the enriched etching medium removed from the etching machine (1) and integrates it over a certain period of time;

eb) in which as many limit values of varying amount of the integral are stored, as there are electrolytic cells (*5a*, *5b*, 5c) in the installation;

ec) on exceeding each limit value of the integral a (further) electrolytic cell (*5a*, *5b*, 5c) is set in operation or on falling below each limit value of the quantity integral a (further) electrolytic cell (*5a*, *5b*, 5c) is put out of operation,

so that the more electrolytic cells (*5a*, *5b*, 5c) are operating, the more enriched etching medium is removed from the etching machine (1) in the predetermined time.

5,035,766

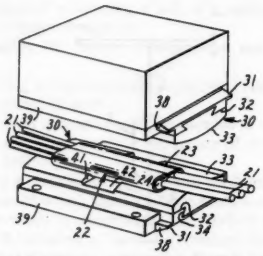
## DEFORMABLE DIE FOR USE WITH SEALANT PADS

James R. More, Woodbury, Minn.; Arnold T. Olsen, and John S. Young, both of Austin, Tex., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sep. 22, 1989, Ser. No. 410,957

Int. Cl.[5] B30B *1/00*

U.S. Cl. 156—581 6 Claims



1. A pair of die plates for use in applying a sealant pad arrangement comprising a flexible substrate having a pad of viscous sealant thereon about an electrical junction joining at least a pair of wires, each said die plate comprising:

a rigid generally rectangular support frame having a first face and a second face, two longitudinal sides and opposite ends, and

a generally rectangular deformable pad of resilient material supported on said first face of said frame, said deformable pads having a convex semicylindrical surface disposed on the side of the pad opposite said first face of the frame with the axis of said convex surface being positioned parallel to said two sides of said frame, and said frame affording said pads to be deformed as said pair of die plates move toward each other to a closed position, and said deformable pads having opposed recesses extending transversely across said deformable pads and generally centrally thereof between opposite ends of said frames to receive the central portion of a said sealant pad and a wire junction, whereby the closing of the deformable pads upon a sealant pad will cause pressure to occur initially along an axis between said ends of the deformable pads, and as the frames move even closer, to cause the deformable pads to spread the wires and to fill the space between the wires with the viscous sealant on the sealant pad.

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5,035,767

## PROCESS FOR GROWING COMPOUND SEMICONDUCTOR MONOCRYSTAL

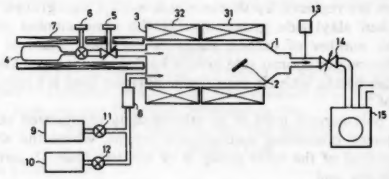
Junichi Nishizawa, 6-16, 1-chome, Komegafukuro, Sendai-shi, Miyagi-ken, Japan, assignor to Research Development Corporation of Japan, Tokyo and Junichi Nishizawa, Miyagi, both of, Japan

Continuation of Ser. No. 918,968, Oct. 15, 1986, abandoned. This application Jul. 19, 1990, Ser. No. 554,097

Claims priority, application Japan, Oct. 16, 1985, 60-228901

Int. Cl.[5] C30B *25/02*

U.S. Cl. 156—613 13 Claims



1. An open-pipe system reduced gaseous phase growth pro-

cess for preparing a semiconductor compound which comprises introducing gases from the exterior into the interior of a reaction pipe in which a monocrystal substrate is positioned, wherein said gases do not contain a carrier gas and each gas contains an element which will become part of the semiconductor compound to be formed.

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**5,035,768**

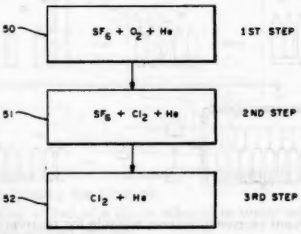
## NOVEL ETCH BACK PROCESS FOR TUNGSTEN CONTACT/VIA FILLING

**Xiao-Chun Mu, Saratoga, and Jagir Multani, Fremont, both of Calif., assignors to Intel Corporation, Santa Clara, Calif.**

**Division of Ser. No. 436,429, Nov. 14, 1989, Pat. No. 4,980,018. This application Jul. 30, 1990, Ser. No. 560,988**

**Int. Cl.[5] B44C *1/22*; C23F *1/02***

**U.S. Cl. 156—626** **4 Claims**




1. In a process for etching a refractory metal, said process utilizing a chlorine containing gas, an improvement comprising the detection of the endpoint of said etch by the measurement and integration of emission lines of chlorine, said lines comprising the 772 nm and 775 nm emission lines of chlorine.

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**5,035,769**

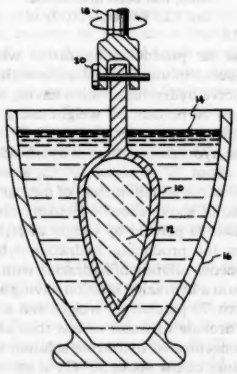
## NONDESTRUCTIVE METHOD FOR CHEMICALLY MACHINING CRUCIBLES OR MOLDS FROM THEIR ENCLOSED INGOTS AND CASTINGS

**Norman D. Stout, and Herbert W. Newkirk, both of Livermore, Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Oct. 4, 1989, Ser. No. 417,146**

**Int. Cl.[5] B44C *1/22***

**U.S. Cl. 156—639** **2 Claims**




1. A method for removing an enveloping container, comprised of a metal selected from the group consisting of vanadium, niobium, tantalum, chromium, molybdenum, tungsten, rhenium, and any rhenium and tungsten alloy, from an included object, comprised of an oxide crystal material selected from the group consisting of YAG, YAG based crystal, garnet, corundum crystal, and ceramic oxide, the method comprising the steps of:

preparing a mixture consisting of potassium nitrate and potassium hydroxide, with said mixture being 15 to 90 percent potassium nitrate by weight;

maintaining the mixture at an elevated temperature above its melting temperature and below the lower of its decomposition temperature or 500 degrees centigrade; and

rotating the enveloping container together with the included object within the mixture maintained at said elevated temperature, at a rate of rotation within the range extending from approximately 30 to 100 revolutions per minute, until the enveloping container is removably chemically machined from the included object.

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**5,035,770**

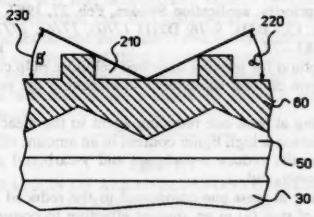
## MFTHODS OF MAKING SURFACE RELIEF GRATINGS

**David M. Braun, Santa Rosa, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Division of Ser. No. 346,182, May 1, 1989. This application Oct. 4, 1990, Ser. No. 592,716**

**Int. Cl.[5] H01L *21/306*; B44C *1/22***

**U.S. Cl. 156—643** **14 Claims**




1. A method of making low reflectivity triangular groove surface relief gratings on a material, the grooves having a substantially uniform repeat distance, the steps of the method comprising:

etching the material surface to form rectangular grooves on the surface; and

ion milling the material in a low pressure, ionizing plasma at a given energy and current density, the ion milling step being performed in a direction perpendicular to the rectangular grooves first at a milling angle $\alpha'$ then at a milling angle $\beta'$.

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**5,035,771**

## PROCESS FOR TREATING DIAMOND GRAINS

**Dietrich Borse, Hamburg, Fed. Rep. of Germany, assignor to Ernst Winter & Sohn GmbH & Co., Hamburg, Fed. Rep. of Germany**

**Filed Jul. 30, 1987, Ser. No. 79,836**

**Claims priority, application Fed. Rep. of Germany, Jul. 30, 1986, 3625743**

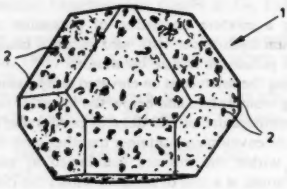
**The portion of the term of this patent subsequent to Feb. 21, 2006, has been disclaimed.**

**Int. Cl.[5] B24D *3/02, 17/00, 18/00***

**U.S. Cl. 156—646** **7 Claims**

1. A method of roughening surfaces of diamond grains, comprising the steps of embedding the diamond grains in a metal powder having a particle size less than 20 μm and of a material selected from a group consisting of iron, cobalt, nickel, a mixture thereof, and alloys thereof; exposing the embedded diamond grains to a stream of one of hydrogen and hydrogen-containing gas at a temperature above 700° C. until pores are etched in surface areas of the diamond grains which are in contact with particles of the metal powder, the diamond

grains being exposed to said stream until their surface areas are at least twice as large as a size of their original surface areas;




and removing the metal powder and other residuals from etched diamond grains.

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5,035,772

## METHOD FOR TREATING BLEACHED LIGNIN CONTAINING CELLULOSE PULP BY REDUCING α-CARBONYL AND γ-CARBONYL GROUPS AND CONVERTING SHORT-WAVE QUANTA TO LONG-WAVE LIGHT QUANTA

**Roland A. Agnemo, and Birgitta E. Lundén-Lundgren, both of Domsjö , Sweden, assignors to Mooch Domsjo AB, Sweden**

**Continuation of Ser. No. 160,809, Feb. 26, 1988, abandoned. This application Sep. 28, 1989, Ser. No. 415,394**

**Claims priority, application Sweden, Feb. 27, 1987, 8700843**

**Int. Cl.[5] D21C** *9/16;* **D21H** *17/05, 17/63, 17/70*

**U.S. Cl. 162—72** **19 Claims**

8. A method for treating bleached cellulose pulp containing a high lignin content subsequent to bleaching the pulp, comprising:

(a) adding at least one reducing agent to the bleached pulp containing a high lignin content in an amount effective to chemically reduce α-carbonyl and γ-carbonyl groups in the lignin, and

(b) adding at least one compound to the reduced bleached pulp of step (a) in an amount effective to convert short-wave light quanta to long-wave light quanta.

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5,035,773

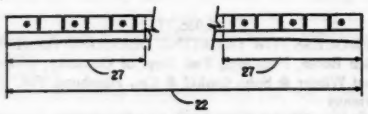
## HEADBOX WITH CONCAVE AUXILIARY BLADE

**Peter J. Hollberg, Richmond, and James C. Swann, Waverly, both of Va., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Oct. 4, 1990, Ser. No. 591,190**

**Int. Cl.[5] D21F** *1/02*

**U.S. Cl. 162—347** **1 Claim**




1. In a papermaking apparatus comprising a headbox having means to receive an aqueous stock containing fibrous solids and an opening along one wall for discharging a layer of the aqueous stock;

a continuous wire belt cooperating with said headbox to receive and drain the layer of aqueous stock as it is discharged from the headbox;

a main blade disposed parallel to and adjacent the headbox wall having the discharge opening, said blade being vertically moveable and capable of changing the height of the discharged layer as it exits the discharge opening; and

an elongated auxiliary blade having a preshaped concave edge extending in the direction of elongation of the blade, said blade being located downstream of and moveably attached to the main blade and extending across the width of the discharge opening of the headbox wall so that it is capable of modifying the basis weight profile of the discharged layer, said auxiliary blade having flexing means at space points along its length to modify the curvature of the edge.

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5,035,774

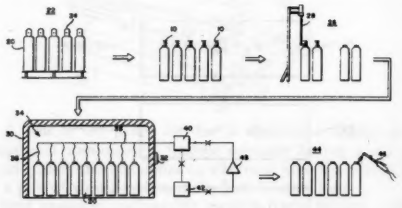
## RECOVERY OF SOLVENT FROM ACETYLENE STEEL CYLINDERS TO MAKE THE CYLINDERS DISPOSABLE

**Michael S. Rabren, Citronelle, Ala., assignor to North American Cylinders, Citronelle, Ala.**

**Filed Apr. 26, 1990, Ser. No. 514,008**

**Int. Cl.[5] B01D** *3/00;* **B08B** *7/04*

**U.S. Cl. 202—164** **13 Claims**



1. A solvent recovery system suitable for recovering solvent from acetylene cylinders, said system comprising:

one or more acetylene steel cylinders containing a porous filler and organic solvent;

heating means for heating said cylinders to a temperature above the boiling point of said solvent;

collecting means for collecting solvent evaporated out of said cylinders; and

manifold means connecting said cylinders to said collecting means for conveying solvent from said cylinders to said collecting means.

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5,035,775

## ULTRAPURE HYDRAZINE PRODUCTION

**Allen B. Quackenbush, and James G. Rigsby, both of Lake Charles, La., assignors to Olin Corporation, Cheshire, Conn.**

**Continuation-in-part of Ser. No. 891,097, Jul. 31, 1986, Pat. No. 4,804,442. This application Feb. 9, 1989, Ser. No. 308,508**

**The portion of the term of this patent subsequent to Feb. 14, 2006, has been disclaimed.**

**Int. Cl.[5] B01D** *3/10, 3/34*

**U.S. Cl. 203—12** **8 Claims**

1. A process for producing hydrazine which comprises admixing an aqueous solution of hydrazine with an alkali metal hydroxide to form a hydrazine solution having a $N_2H_4$ concentration of at least 70 percent by weight and a molar ratio of alkali metal hydroxide to water of about 0:15:1 to about 0:5:1, and distilling the hydrazine solution at overhead vapor temperatures of from about 10° to about 50° C., at overhead vapor pressures below about 60 millimeters of mercury and an initial hydrostatic head of above about 4 feet such that a hydrazine containing at least 98 percent by weight of $N_2H_4$ is obtained.

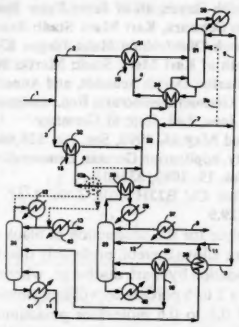
6. A process for producing hydrazine which comprises admixing an aqueous solution of hydrazine with an alkali metal hydroxide to form a hydrazine solution having a $N_2H_4$ concentration of at least 70 percent by weight and a molar ratio of alkali metal hydroxide to water of less than about 0.5:1, and distilling the concentrated hydrazine solution at an overhead vapor temperature below about 50° C., at an overhead vapor pressure of less than about 60 mm Hg., and a viscosity in the liquid phase of no higher than about 15 centipoises such that a hydrazine containing at least 98 percent by weight of $N_2H_4$ is obtained.

5,035,776

## LOW ENERGY EXTRACTIVE DISTILLATION PROCESS FOR PRODUCING ANHYDROUS ETHANOL

Jeffrey P. Knapp, Newark, Del., and Michael F. Doherty, Montagne, Me., assignors to University of Massachusetts, Amherst, Mass.

Filed Mar. 29, 1990, Ser. No. 502,112
Int. Cl.[5] B01D 3/40
U.S. Cl. 203—19 24 Claims



1. A method for the production of substantially anhydrous ethanol comprising the steps of:

(a) splitting a feed of a dilute ethanol in water mixture into first and second stream;

(b) distilling said first stream in a first preconcentrating distillation column to produce a first liquid bottoms product and a first concentrated ethanol overhead vapor stream;

(c) distilling said second stream in a second preconcentrating distillation column at an increased pressure relative to said first preconcentrating column to produce a second liquid bottoms product and a second concentrated ethanol overhead vapor stream;

(d) preheating said first and second streams with said first and second bottoms products respectively;

(e) condensing and combining said first and said second concentrated ethanol overhead vapor stream;

(f) distilling said combined first and second concentrated ethanol overhead streams by extractive distillation in a third distillation column at an increased pressure relative to both preconcentrating columns to produce a third liquid bottoms product and a third overhead vapor stream;

(g) distilling said third liquid bottoms product in a fourth distillation column to produce a fourth liquid bottoms stream and a fourth overhead vapor product;

(h) recycling said fourth liquid bottoms stream to said third distillation column as an upper feed stream;

(i) recovering heat from the condensation of said second concentrated ethanol overhead vapor stream, and using said recovered heat for heating said first preconcentrating distillation column;

(j) condensing said third overhead vapor stream to result in substantially anhydrous ethanol with heat recovered therefrom being used to heat said second preconcentrating distillation column;

(k) heating said third liquid bottoms and said fourth liquid bottoms with outside sources of heat;

(l) preheating combined first and second overhead streams from said first and second distillation columns prior to their introduction into said third distillation column by first acquiring thermal values from aid recycled fourth liquid bottoms stream and then from said third liquid bottoms product, wherein said fourth distillation column is pressurized at a range of from subatmospheric pressure to about 2 atmospheres pressure.

15. A method for the production of substantially anhydrous ethanol comprising the steps of:

(a) distilling a dilute aqueous ethanol mixture in a first distillation column and producing a first liquid bottoms product and a first concentrated ethanol overhead vapor stream which is then condensed;

(b) preheating said dilute aqueous ethanol mixture by heat exchange with said first liquid bottoms product;

(c) separating said first condensed concentrated ethanol overhead stream by extractive distillation in a second distillation column at an increased pressure relative to said first distillation column to produce a second liquid bottoms stream and a second overhead vapor product;

(d) distilling said second liquid bottoms stream in a third distillation column to produce a third liquid bottoms stream and a third overhead vapor product;

(e) recycling said third liquid bottoms stream to said second distillation column;

(f) condensing said second overhead vapor product to obtain a substantially anhydrous ethanol;

(g) partially heating said first distillation column with heat obtained from condensing said second overhead vapor product;

(h) providing the balance of the heating of said first distillation column with ann outside source of heat;

(i) heating said second and third distillation columns by outside sources of heat;

(j) heating said first concentrated ethanol overhead stream condensed from said first distillation column prior to its introduction into said second distillation column with heat from said recycled third liquid bottoms stream, wherein said third distillation column is pressurized at a range of from subatmospheric pressure to about 2 atmospheres pressure.

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5,035,777

## PREPARATION OF ALKANESULFONYL HALIDES AND ALKANESULFONIC ACIDS

David M. Gardner, Worcester Township, Montgomery County, Pa., and Gregory A. Wheaton, Logan Township, Gloucester County, N.J., assignors to Atochem North America, Inc., Philadelphia, Pa.

Continuation-in-part of Ser. No. 164,599, Mar. 7, 1988, abandoned. This application Apr. 20, 1990, Ser. No. 511,867
Int. Cl.[5] C25B 3/02
U.S. Cl. 204—79 23 Claims

1. A continuous method of preparing alkanesulfonyl halides of the formula $RSO_2Y$, wherein Y is chlorine or bromine, or alkanesulfonic acids of the formula $RSO_3H$, wherein R is a non-halogen substituted or unsubstituted alkyl group having one to 20 carbon atoms, comprising the continuous-flow electrolysis of a sulfur compound of the formula RSX, wherein X is hydrogen or a radical of the formula SR′ and where R and R′ are non-halogen substituted or unsubstituted alkyl groups having one to 20 carbon atoms, in an aqueous hydrohalic (HY) acid-containing medium to oxidize the sulfur compound, continuously removing electrolyzed product mixture from the electrolysis zone, and recovering the alkanesulfonyl halide or alkanesulfonic acid from the product mixture.

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5,035,778

## REGENERATION OF SPENT FERRIC CHLORIDE ETCHANTS

Perminder Bindra, Vestal; Kathleen L. Covert, Kirkwood, both of N.Y., and David N. Light, Friendsville, Pa., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 12, 1989, Ser. No. 350,971
Int. Cl.[5] C25B 1/26
U.S. Cl. 204—94 13 Claims

1. A method for regenerating a spent ferric chloride etching composition without generating chlorine gas which comprises:

providing an electrolysis cell having an anode compartment

containing an anode, a cathode compartment containing a cathode, and an anion-exchange membrane separating the cathode compartment from the anode compartment;

introducing an anolyte comprising spent ferric chloride etching composition into the anode compartment and introducing a catholyte into said cathode compartment;

said spent ferric chloride etching composition having a total iron concentration that is substantially equal to the original total iron concentration of the original ferric chloride etching composition before etching;

applying a voltage of +0.6 volts to +1.5 volts versus a saturated calomel electrode to said anode to thereby oxidize ferrous ions to ferric ions and thereby regenerating the spent ferric chloride etching composition.

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**5,035,779**

## PROCESS FOR PRODUCING CATHODE AND PROCESS FOR ELECTROLYSIS USING SAID CATHODE

**Yoshinori Nishiki, Fujisawa; Shuji Nakamatsu, Yokohama, and Takayuki Shimamune, Machida, all of Japan, assignors to Permelec Electrode Ltd., Kanagawa, Japan**

**Division of Ser. No. 213,047, Jun. 29, 1980, Pat. No. 4,900,419. This application Nov. 24, 1989, Ser. No. 440,835**

**Claims priority, application Japan, Jun. 29, 1987, 62-1596585; Jul. 17, 1987, 62-177086**

**Int. Cl.[5] C25B *1/16***

**U.S. Cl. 204—98** **12 Claims**

1. The process for electrolysis of one or more electrlyte solutions comprising applying an electric potential across an anode electrode and a cathode electrode present in an anolyte and a catholyte respectively, to thereby pass an electric current through one or more electrolyte solutions, wherein the cathode electrode comprises a conductive base having a nickel surface and a coating layer provided thereon, said layer consisting essentially of at least on platinum group component from the group consisting of a platinum group metal, a platinum group metal oxide, and a platinum group metal hydroxide, said platinum group component being present in an amount of from 0.5 to 20 $g/m^2$ on a platinum group metal basis, and (b) at least one cerium component selected from the group consisting of cerium, cerium oxide, and cerium hydroxide, said cerium component being present in an amount of from 0.5 to 10 $g/m^2$ on a cerium basis.

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**5,035,780**

## METHOD OF MANUFACTURING A PLATINUM TIP

**Teruo Suzuki; Kenichi Ogawa, both of Tokyo, and Hiroshi Murakami, Tsukuba, all of Japan, assignors to Agency of Industrial Science and Technology and Seiko Instruments Inc., both of, Japan**

**Filed Mar. 23, 1989, Ser. No. 328,029**

**Claims priority, application Japan, Mar. 25, 1988, 63-71084; Nov. 15, 1988, 63-289064**

**Int. Cl.[5] C25F *3/16***

**U.S. Cl. 204—129.35** **16 Claims**

1. A method of manufacturing a platinum tip having a sharp point, which comprises the steps of: subjecting a platinum material to primary polishing to form a sharp point portion, and subjecting the treated platinum material to secondary electropolishing with a mixed aid comprising sulfuric acid, nitric acid, and phosphoric acid to further sharpen the sharp point portion.

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**5,035,781**

## ELECTROLYTE FOR THE PRODUCTION OF BLACK SURFACE LAYERS ON LIGHT METALS

**Jürgen Schmidt; Thomas Furche; Roland Erdmann; Marion Reichert; Ullrich Bayer, all of Jena; Peter Kurze, Oberlichtenau; Thomas Schwarz, Karl Marx Stadt; Joachim Schreckenbach, Limbach-Oberfrohna; Hans-Jürgen Kletke; Andreas Hoffmann, both of Karl Marx Stadt; Martin Heppner, Jena; Anja Hasse, Berlin; Dorith Schmidt, and Annette Klaus, both of Jena, all of German Democratic Rep., assignors to Jenoptik Jena GmbH, Jena, Fed. Rep. of Germany**

**Filed May 24, 1990, Ser. No. 528,664**

**Claims priority, application German Democratic Rep., Jul. 19, 1989, 331003; Jul. 19, 1989, 331004**

**Int. Cl.[5] B23H *1/08, 3/06, 7/34***

**U.S. Cl. 204—129.9** **2 Claims**

1. An electrolyte for the production of black surface layers on light metals or alloys thereof, preferably titanium, by means of an anodic oxidation by spark discharge, wherein the electrolyte consists of a 2 to 6 percent by volume ammoniacal acqueous solution of 0.3 to 0.6 mole/liter potassium dihydrogenphosphate; 0.08 to 0.3 mole/liter potassium chromate and of acetate ions in concentrations of 0.08 to 0.5 mole/liter.

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**5,035,782**

## METHOD FOR THE FORMATION OF MONOMOLECULAR ADSORPTION FILMS OR BUILT-UP FILMS OF MONOMOLECULAR LAYERS USING SILANE COMPOUNDS HAVING AN ACETYLENE OR DIACETYLENE BOND

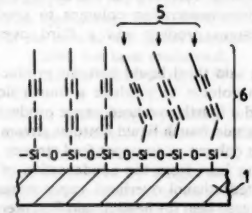
**Hideharu Tamura, Tokyo, and Kazufumi Ogawa, Osaka, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan**

**Filed Jun. 27, 1989, Ser. No. 371,893**

**Claims priority, application Japan, Jun. 28, 1988, 63-160061; Jul. 6, 1988, 63-168205**

**Int. Cl.[5] G11B *5/72***

**U.S. Cl. 204—157.6** **30 Claims**




1. A method for the formation of a monomolecular adsorption film which comprises

providing a substrate having a layer comprising molecules which react with a silane compound having at least one diacetylene bond;

chemically adsorbing the silane compound to the layer to form a monomolecular adsorption film of the silane compound on the substrate through the layer at a temperature not higher than 20° C.;

selectively heating a pattern of adsorbed film to a temperature sufficient to cause molecules of the silane compound in the heated portions to become obliquely oriented; and

irradiating the film with an energy beam to form a conjugated diacetylene polymer only in the selectively heated portions of film.

## 5,035,783

## METHOD FOR THE PHOTOCHEMICAL CONVERSION OF TACHYSTEROL COMPOUNDS INTO PREVITAMIN D COMPOUNDS AND OF TRANS-VITAMIN D COMPOUNDS INTO CIS-VITAMIN D COMPOUNDS

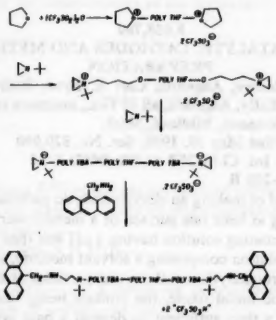
Eric Goethals, Gent, Belgium; Sebastianus J. Halkes, and Robert B. Koolstra, both of Weesp, Netherlands, assignors to Duphar International Research B.V., Weesp, Netherlands

Filed Dec. 7, 1989, Ser. No. 447,509

Claims priority, application Netherlands, Dec. 12, 1988, 8803040

Int. Cl.[5] B01J *19/08*

U.S. Cl. 204—157.67 9 Claims



1. A method for the photochemical conversion of tachysterol compounds into previtamin D compounds and of trans-vitamin D compounds into cis-vitamin D compounds under the influence of radiation by exposing the tachysterol compound and trans-vitamin D compound, respectively, dissolved in a solvent system, in the presence of a polymeric photosensitizer consisting of a polymer chain comprising covalently bound sensitizers for the photochemical conversion, to light with a wavelength of between approximately 300 and approximately 1,000 nm, and by then isolating the resulting previtamin D compound and cis-vitamin D compound, respectively, characterised in that a polymeric photosensitizer is used, the polymer chain of which has been selected from the group consisting of a polyether chain, an amino groups-containing polymer chain and a block copolymer chain comprising polyether segments and/or amino groups-containing polymer segments, in such a manner that the polymeric photosensitizer dissolves in the solvent system during exposure to radiation but either upon cooling precipitates from the solution and can be separated, or, in case said polymer chain comprises amino groups, can be protonated with an acid substance and be removed in an after-treatment.

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## 5,035,784

## DEGRADATION OF ORGANIC CHEMICALS WITH TITANIUM CERAMIC MEMBRANES

Marc A. Anderson; Simonetta Tunesi, and Qunyin Xu, all of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Continuation-in-part of Ser. No. 224,052, Jul. 25, 1988, abandoned, which is a continuation-in-part of Ser. No. 78,043, Jul. 27, 1987, abandoned. This application Jun. 18, 1990, Ser. No. 540,408

Int. Cl.[5] C07C *1/26;* C10G *17/00*

U.S. Cl. 204—158.14 8 Claims

1. A method of degrading complex organic molecules comprising the steps of exposing the organic molecules in solution to a ceramic porous membrane of titanium; and irradiating the titanium membrane with ultraviolet light wherein the step of exposing the complex organic molecules to the membrane includes adsorbing the molecules in the membrane.

## 5,035,785

## NONIONIC SURFACTANT AS A PIGMENT DISPERSANT AND FILM BUILD ADDITIVE

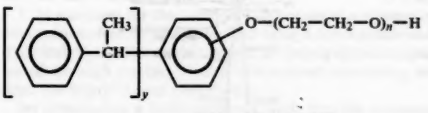
Tapan K. Debroy, Utica; Ding Y. Chung, Rochester Hills; Sioe-Heng A. Tjoe, Troy, and Craig R. Deschner, Southfield, all of Mich., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 23, 1990, Ser. No. 483,838

Int. Cl.[5] C25D *13/10;* C08L *63/02;* C08K *5/00*

U.S. Cl. 204—181.7 6 Claims

5. In a method of coating a conductive substrate serving as a cathode comprising passing an electric current between said cathode and anode in electrical contact with an aqueous electrodepositable bath composition, wherein the aqueous electrodepositable bath composition comprises an epoxy/amine adduct, a blocked polyisocyanate crosslinker and a pigment paste comprising a pigment and a pigment dispersant, wherein the improvement comprises a pigment dispersant consisting essentially of an ethoxylated styrenated phenol having the formula:



wherein

n denotes a number from 3–30, and

y denotes a number from 2–3.

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## 5,035,786

## FLUORESCENT TAG FOR SUGAR ELECTROPHORESIS

Brian K. Brandley, Alameda, and Michael Tiemeyer, Oakland, both of Calif., assignors to Glycomed, Incorporated, Alameda, Calif.

Filed Feb. 16, 1990, Ser. No. 483,043

The portion of the term of this patent subsequent to Dec. 4, 2007, has been disclaimed.

Int. Cl.[5] C07H *1/06, 3/00;* C25B *7/00*

U.S. Cl. 204—182.1 22 Claims

1. A method of separating a mixture of saccharides into distinct detectable groups, comprising the steps of:

reacting the mixture of saccharides with a modified form of 1-amino-4-naphthalene sulfonic acid to form conjugates, the 1-amino-4-naphthalene sulfonic acid being modified by the addition of a light-sensitive azido-group;

subjecting the conjugates to gel electrophoresis in an electrophoresis gel for a sufficient period of time to form separate groups of conjugates in the electrophoresis gel;

electro-blotting the separate groups of conjugates from the electrophoresis gel onto the surface of a membrane; and

subjecting the conjugates on the membrane to light for a sufficient time and of a light frequency which activates the light-sensitive azido-group.

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## 5,035,787

## METHOD FOR REPAIRING SEMICONDUCTOR MASKS AND RETICLES

Norman W. Parker, Westlake Village; William P. Robinson, Newbury Park, and Robert L. Piccioni, Thousand Oaks, all of Calif., assignors to MicroBeam, Inc., Newbury Park, Calif.

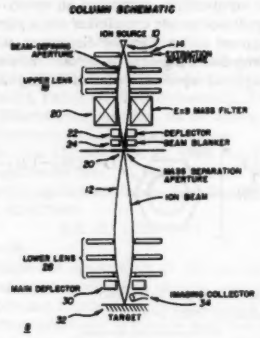
Division of Ser. No. 53,318, Jul. 22, 1987, abandoned. This application Dec. 18, 1989, Ser. No. 453,413

Int. Cl.[5] C23F *1/02*

U.S. Cl. 204—192.34 4 Claims

1. A method for repairing an opaque defect in a semiconductor mask or reticle, said semiconductor mask or reticle comprising a first, clear, substrate material on the surface of which a pattern of a second opaque material has been deposited, including the steps of:

(a) creating an image of the area on said mask or reticle containing said opaque defect with a first focused ion beam comprised of a first ion species, said first ion species compatible with said first material,
(b) defining the area of said opaque defect,
(c) sputter etching the area of said opaque defect using a second ion beam of a second ion species, said second ion species having a relatively high atomic weight compared to said first ion species,
(d) creating an image of the area on said mask or reticle where said opaque defect was located using a focused ion beam comprised of said first ion species,




(e) determining whether said opaque defect has been repaired,
(f) repeating steps (a) through (e) if said opaque defect has not been repaired,
(g) scanning the area of said opaque defect with a focused ion beam comprised of said first ion species for a time sufficient to remove the surface layer of material from the surface of said substrate material which is contaminated by ions of said second species if said opaque defect has been repaired.

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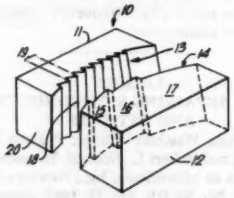
**5,035,788**

## ELECTROCHEMICAL DRILLING APPARATUS

**Colin G. Radnedge, Bristol, England, assignor to Rolls-Royce plc, London, England**

**Filed Apr. 27, 1990, Ser. No. 515,568**
**Claims priority, application United Kingdom, May 6, 1989, 8910477**
**Int. Cl.[5] B23H *3/04, 9/10, 9/14***
**U.S. Cl. 204—224 M** **8 Claims**




1. An apparatus for electrochemically drilling a plurality of non-parallel holes simultaneously along a curved path in a workpiece, the apparatus comprising:
(a) a plurality of electrode tubes; and
(b) a guide block separable into two parts having respective first and second opposed surfaces, the guide block being provided in the first surface with a set of serrations each of which is adapted to hold a respective electrode tube whereby when the two surfaces are brought together the electrode tubes are clamped between said surfaces;
wherein the surfaces are shaped and the serrations are orientated in the first surface so that the electrode tubes lie substantially in a line curved in a direction generally perpendicular to at least some of the longitudinal axes of the tubes, and the directions of the longitudinal axes of the tubes vary along that line, the curvature of said line corresponding at least approximately to the curvature of said path.

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**5,035,789**

## ELECTROCATALYTIC CATHODES AND METHODS OF PREPARATION

**Richard N. Beaver, Angelton; Carl E. Byrd, Richwood, and Stephen L. Kelly, Angelton, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed May 29, 1990, Ser. No. 529,990**
**Int. Cl.[5] C25B *11/08*; B05D *5/12***
**U.S. Cl. 204—290 R** **37 Claims**

1. A method of making an electrocatalytic cathode comprising contacting at least one surface of a metallic-surfaced substrate with a coating solution having a pH less than about 2.8, the coating solution comprising a solvent medium, at least one primary electrocatalytic metal ion and particles of at least one electrocatalytic metal oxide, the contact being under conditions and for a time sufficient to deposit a base layer on the surfaces of the substrate by non-electrolytic reduction deposition, the base layer containing an effective amount of the primary electrocatalytic metal with the electrocatalytic metal oxide particles entrapped therein.

21. A cathode produced according to claim 1.

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**5,035,790**

## HIGHLY DURABLE CATHODE WITH LOW HYDROGEN OVERVOLTAGE AND METHOD FOR PRODUCING THE SAME

**Takeshi Morimoto, and Naoki Yoshida, both of Yokohama, Japan, assignors to Asahi Glass Co., Ltd., Tokyo, Japan**

**Filed Jun. 26, 1990, Ser. No. 544,189**
**Claims priority, application Japan, Jun. 30, 1989, 1-167103**
**Int. Cl.[5] C25B *11/06***
**U.S. Cl. 204—290 R** **7 Claims**

1. A highly durable cathode with a low hydrogen overvoltage, which comprises an electrode core and electrode active metal particles provided on the core, wherein at least a part of said electrode active metal particles is made of a hydrogen absorbing alloy electrochemically absorbing and desorbing hydrogen, and said hydrogen absorbing alloy is represented by the formula:

$$MmNi_xAl_yM_z \quad (I)$$

wherein Mm is misch metal, M is at least one element selected from the group consisting of Mn, Cu, Cr, Co, Ti, Nb, Zr and Si, and $2 \leq x \leq 5$, $0 < y \leq 3$, $0 < z \leq 4$ and $2.5 \leq x+y+z \leq 8.5$.

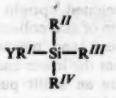
5,035,791

## ION SENSOR CONTAINING A SELECTIVE ORGANIC MEMBRANE

Massimo Battilotti, and Matteo Giongo, both of Rome, Italy, assignors to Enitricerche S.p.A., Milan, Italy

Filed Jul. 19, 1988, Ser. No. 221,436
Claims priority, application Italy, Jul. 24, 1987, 21430 A/87
Int. Cl.[5] G01N 27/30
U.S. Cl. 204—415 6 Claims

1. An ion sensor, containing an organic polymeric matrix, an ionophore and a device based on an EMOS or ISFET (CHEMFET) semiconductor, containing on its surface silicon oxide adhering to said organic polymeric matrix by means of a polysiloxanic matrix, wherein said polysiloxanic matrix is selected from the organosilanes of the formula:



wherein:

$R^{II}$, $R^{III}$ and $R^{IV}$, which are the same or different from each other, are alkyl or alkoxy groups containing from 1 to 10 carbon atoms;

$R^{I}$ is $-(CH_2)_p X (CH_2)_q-$

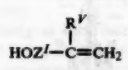
wherein:

X is $-CH_2-$ or a mono- or polycondensed aromatic group, or —NH— or —O—,

p and q, which are the same or different from each other, are integers having a value of from 0 to 10, with a value of 0 being excluded when X is either —NH— or —O—;

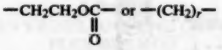
Y is $-NH_2$, —OH or —SH;

and wherein the polymeric organic matrix is based on a polymer obtained by reacting (1) a polymerized olefin, whose monomer has the formula:



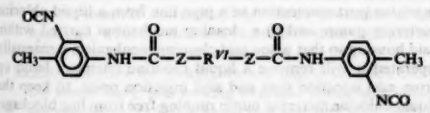
wherein:

$Z^{I}$ is



wherein r is an integer having a value of from 1 to 10, and $R^{V}$ is either H or $CH_3$, with the proviso that $R^{V}$ is not $CH_3$ when $Z^{I}$ is $-(CH_2)_r-$,

with (2) a compound obtained by reacting 2,4-toluenediisocyanate with a di-alcohol, a di-amine, a glycol, a tri-alcohol or a tri-amine having the formula:

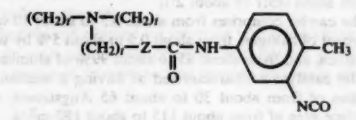


wherein:

$R^{VI}$ is $-(CH_2CH_2O)_mCH_2CH_2-$, wherein m is an integer having a value from 1 to 20,000;

or is $-(CH_2)_s-$,

wherein s is an integer having a value of from 1 to 20, or is:



wherein

t is an integer having a value of from 1 to 10 and

Z is —NH— or —O—, with the proviso that Z is not —NH— when $R^{VI}$ is $-(CH_2CH_2O)_mCH_2CH_2-$.

5,035,792

## CLEANUP OF HYDROCARBON-CONVERSION SYSTEM

Arthur A. Foutsitzis, Worcester, Mass.; Frank G. Padrta, Des Plaines, and Michael B. Russ, Elmhurst, both of Ill., assignors to UOP, Des Plaines, Ill.

Filed Nov. 19, 1990, Ser. No. 615,105
Int. Cl.[5] C10G 35/09
U.S. Cl. 208—138 17 Claims

1. In a process for the catalytic conversion of a substantially contaminant-free hydrocarbon feed using a contaminant-sensitive catalyst, in a conversion system having equipment contaminated through contact with a contaminant-containing prior feed, the improvement comprising:

(a) introducing a hydrocarbon solvent into the conversion system, contacting substantially all of the contaminated equipment with the solvent at contaminant-purging conditions to purge the contaminants therefrom until contaminant purging from the conversion system is substantially complete and the system is contaminant-free, and withdrawing the hydrocarbon solvent containing the purged contaminants; thereafter

(b) loading the contaminant-sensitive catalyst into the contaminant-free conversion system; and thereafter

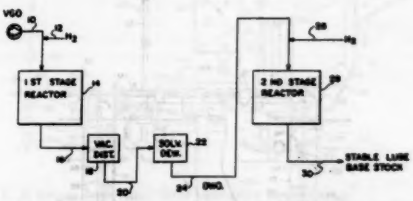
(c) contacting the hydrocarbon feed in the contaminant-free conversion system with the contaminant-sensitive catalyst at hydrocarbon-conversion conditions.

5,035,793

## HYDROTREATING CATALYST AND PROCESS

Eugene Nebesh, Parma; Robert A. Plundo, Hudson, and Steven L. McMahon, Macedonia, all of Ohio, assignors to Engelhard Corporation, Edison, N.J.

Division of Ser. No. 197,455, May 23, 1988, Pat. No. 4,957,895.
This application Aug. 3, 1990, Ser. No. 551,436
Int. Cl.[5] C10G 45/00
U.S. Cl. 208—143 11 Claims




1. A process for enhancing lubricating oils and improving their viscosity index and/or reducing the aromatic content of the oil which comprises contacting a crude lubricating oil stock with hydrogen under hydrogenating conditions including elevated temperatures and pressures in the presence of the hydrotreating catalyst comprising at least one Group VI metal, metal oxide, or metal sulfide, or mixtures thereof, and at least one Group VIII metal, metal oxide, or metal sulfide, or mixtures thereof, supported on a carrier wherein

(A) the catalyst comprises from about 10% to about 35% by weight of combined metal, and the atomic ratio of the

Group VIII metal to Group VI metal is in the range of from about 0.5:1 to about 2:1;

(B) the carrier comprises from about 0.5 to about 10 weight percent of halogen, from about 0.5 to about 5% by weight of silica, and from about 85 to about 99% of alumina; and

(C) the catalyst is characterized as having a median pore radius of from about 30 to about 65 Angstroms, and a surface area of from about 115 to about 180 $m^2/g$.

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**5,035,794**

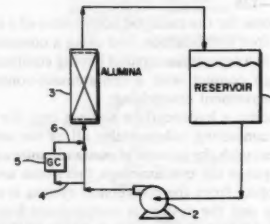
## ISOPRENE RECOVERY IN THE BUTYL RUBBER PROCESS

**Harvey E. Atwood, Kingwood, Tex., assignor to Exxon Chemical Patents Inc., Linden, N.J.**

**Division of Ser. No. 922,679, Oct. 24, 1986, which is a continuation of Ser. No. 814,097, Dec. 27, 1985. This application Oct. 11, 1989, Ser. No. 419,914**

**Int. Cl.[5] C10G *25/05***

**U.S. Cl. 208—262.1** **10 Claims**




1. A process for removing t-butyl chloride from an olefinic hydrocarbon stream comprising a mixture of isobutylene and isoprene, which comprises the step of contacting said olefinic hydrocarbon stream with alumina at a temperature ranging from about −40° C. to about 120° C. for a time sufficient to remove said t-butyl chloride.

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**5,035,795**

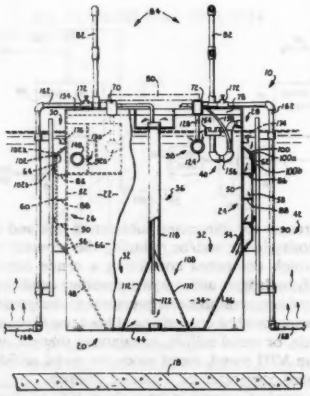
## MODULAR CLARIFIER WITH INTEGRAL FLOCCULATOR

**Lawrence A. Schmid, Manhattan, Kans., assignor to Aero-Mod, Inc., Manhattan, Kans.**

**Filed May 11, 1990, Ser. No. 522,252**

**Int. Cl.[5] C02F *11/14*; B01D *21/24***

**U.S. Cl. 210—197** **10 Claims**



1. A waste treatment module adapted to be positioned within a basin for the treatment of solids-containing liquid waste therein, said module comprising:

walls defining an upright treatment chamber having a liquid waste inlet adjacent the upper end of the chamber;

means within said chamber and beneath said inlet for promoting the flocculation of waste solids, including flocculation structure for causing said solids to traverse a tortuous, descending flow path within the chamber;

means defining a sedimentation zone below said flocculation-promoting means for permitting collection of flocculent within said chamber, said sedimentation zone-defining structure including apertured walls presenting an upright, closed-top collector;

means communicating with said sedimentation zone for withdrawing portions of the collected flocculent upwardly at a substantially uniform rate for return of the flocculent to said basin, said flocculent-withdrawal means comprising an elongated, upright withdrawal pipe extending through the top of said collector to communicate with the interior thereof, and means for introducing compressed air adjacent the lower end of the withdrawal pipe whereby to create an airlift pumping action for withdrawal of flocculent from said collector and return thereof to the basin; and

means adjacent the upper end of said chamber for withdrawing treated liquid therefrom.

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**5,035,796**

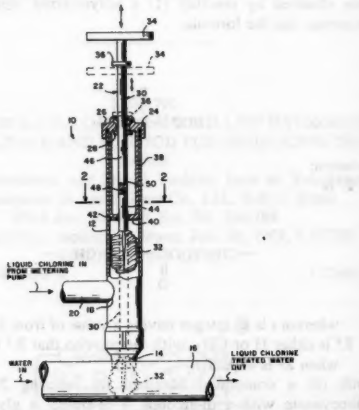
## LIQUID LINE CHLORINE CLEANER

**Robert F. Saylor, 119 E. Main, Potterville, Mich. 48876, and George Spector, 233 Broadway, New York, N.Y. 10007**

**Filed Feb. 26, 1990, Ser. No. 484,505**

**Int. Cl.[5] B08B *1/00***

**U.S. Cl. 210—198.1** **3 Claims**




1. A liquid chlorine injection line cleaner comprising: a) an elongated cylindrical housing having a bottom injection point attached transversely into a water main line and a low, side injection port connection to a pipe line from a liquid chlorine metering pump; and b) a cleaning mechanism carried within said housing so that when said cleaning mechanism is manually operated it will remove a liquid chlorine chemical build up from said injection port and said injection point, to keep the liquid chlorine metering pump running free from line blockage; wherein said cleaning mechanism includes: c) an o-ring to fit upon top end of said housing; d) an internally threaded cap to thread onto the top end of said housing over said o-ring so as to seal said cap thereto; e) a gasket seal carried within said cap; f) an operating rod extending upwardly through said gasket seal; g) a reciprocating wire brush head connected to inner end

of said rod; and h) a handle affixed to outer end of said rod so that a person can grip said handle and move said wire brush head up and down within said housing.

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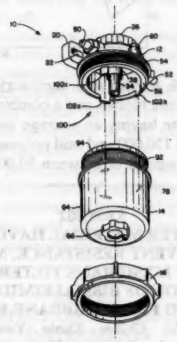
**5,035,797**

## KEY SYSTEM FOR FILTER ASSEMBLY

**Leon P. Janik, Suffield, Conn., assignor to Stanadyne Automotive Corp., Windsor, Conn.**

**Filed Feb. 14, 1990, Ser. No. 480,032**
**Int. Cl.[5] B01D *27/08***
**U.S. Cl. 210—232** **21 Claims**



1. A fuel filter system comprising:
base means defining an inlet and an outlet;
cartridge means mountable to said base means comprising filter means and at least partially defining a flow path communicable with said inlet and outlet for filtering fuel passing through said filter means;
key means comprising at lest one key axially projecting from said base means; and
slot means for defining at least one slot in said cartridge means, a said slot being dimensioned and located for axially receiving a corresponding key at a first fixed angular position, said slot means engageable with said key means for locking said cartridge means at said first fixed angular position of said base means.

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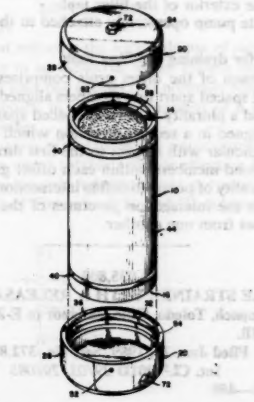
**5,035,798**

## FILTRATION VESSEL AND END CAP LOCK BY A FLEXIBLE ROD

**Lawrence Stenger, 20 W. Plumosa La., Lake Worth, Fla. 33467**

**Filed Mar. 16, 1990, Ser. No. 494,981**
**Int. Cl.[5] B01D *27/08***
**U.S. Cl. 210—232** **13 Claims**

1. A water filtration device, comprising:
a vessel body having an open interior for containing a filter medium, said vessel body having at least one open end;
an end cap comprising an end wall and a side wall, said side wall having an inside dimension substantially equal to and greater than the corresponding outside dimension of said open end, whereby said end cap will fit over the open end of the vessel body to close the open end;
locking structure for locking the end cap to the open end of the vessel body, said locking structure comprising a locking groove on an inside surface of said side wall, with an access opening extending through said side wall to said locking groove, said locking structure further comprising a corresponding locking groove positioned on said tubular vessel body such that said locking groove on said end cap can be juxtaposed with said corresponding locking groove on said vessel body when said end cap is fitted over said open end, said juxtaposed locking grooves forming a locking channel;
a flexible rod adapted for insertion into said locking channel through said access opening, said flexible rod being dimensioned in cross-section so as to fit snugly within said



locking channel, whereby said locking grooves and said flexible rod will provide a non-toxic joint for preventing disengagement of said end caps from said vessel body under the internal operating pressure of water flowing through said water filtration device.

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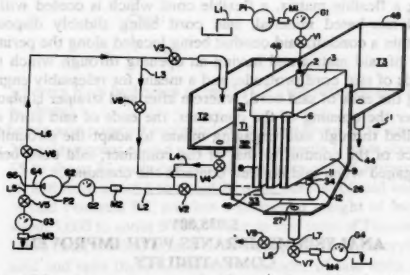
**5,035,799**

## FILTER ASSEMBLY

**Louis Rosberg, Southfield; Devendra V. Mehta, Bloomfield Hills; Aaron Rosberg, Southfield, and Ron Billbury, Algonac, all of Mich., assignors to Clear Flow, Inc., Southfield, Mich.**

**Filed Aug. 21, 1989, Ser. No. 396,133**
**Int. Cl.[5] B01D *29/00, 29/39***
**U.S. Cl. 210—232** **20 Claims**



1. A cross flow fluid filter assembly comprising:
**(a) a header box for receiving a fluid to be filtered under pressure, the header box having a pierced wall with apertures formed therethrough for providing fluid communication with a filter tank for delivering pressurized fluids thereto,**
**(b) a filter tank in fluid communication with the header box;**
**(c) at least one filter leaf disposed within the tank and comprising:**
**(1) a fluid tight frame,**
**(2) a filter core having at least two abutting offset grids contained within the frame,**

(3) a drain tube within said grids, the tube having at least one aperture formed therethrough,

(4) at least one filtering media sealingly covering the core,

(d) means for sealingly attaching the filter leaf to a filtrate manifold such that the filter leaf drain tube and filtrate manifold are in fluid communication;

(e) a filtrate manifold, the manifold being affixed within the filter tank, the manifold being in fluid communication with the exterior of the filter tank;

(f) a filtrate pump operatively attached to the filtrate manifold;

(g) means for draining the filter tank:

wherein each of the offset grids comprises a plurality of parallel spaced apart first members aligned in a first direction, and a plurality of parallel spaced apart second members aligned in a second direction which is substantially perpendicular with respect to the first direction, the first and second members within each offset grid intersecting at a plurality of points to define intersection junctures; and wherein the intersection junctures of the abutting grids are offset from one another.

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**5,035,800**

**FLEXIBLE STRAINER WITH A RELEASABLE CORD**

**Robert J. Kopach, Toledo, Ohio, assignor to E-Z Strainer, Inc., Chicago, Ill.**

**Filed Jun. 28, 1989, Ser. No. 372,886**

**Int. Cl.[5] B01D** *29/03, 29/085*

**U.S. Cl. 210—469** **5 Claims**

1. A strainer which may be adapted to fit over an opening of a variety of food storage and preparation containers comprising a flexible matrix, a flexible cord which is coated with a polymer-based material, said cord being slidably disposed within a conduit, said conduit being located along the perimeter of said matrix and having an opening through which the ends of said cord protrude, and a means for releasably engaging the ends of said cord, wherein after said strainer is placed over the opening of the container, the ends of said cord are pulled through said engaging means to adapt the circumference of the conduit to that of the container, said cord being engaged when said conduit contacts the container.

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**5,035,801**

**ANALYSIS MEMBRANES WITH IMPROVED COMPATIBILITY**

**Gottfried Schmer, Seattle, Wash., assignor to Akzo NV, Arnhem, Netherlands**

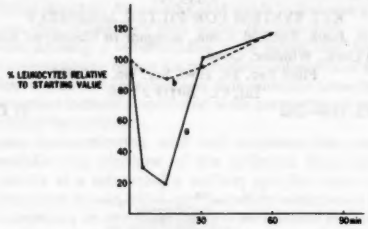
**Continuation of Ser. No. 671,434, Nov. 13, 1984, abandoned. This application Mar. 28, 1988, Ser. No. 174,092**

**Claims priority, application Fed. Rep. of Germany, Nov. 12, 1983, 3341113**

**Int. Cl.[5] B01D** *13/00*

**U.S. Cl. 210—490** **13 Claims**

1. A dialysis membrane for reducing a leukopenia effect which is formed as a flat foil, a tube foil or a hollow fiber or regenerated cellulose comprising a membrane surface having a polymeric acid chemically bound across a bridgeformer chemically bound to the cellulose, said bridgeformer being chemically bound with said polymeric acid across amide linkages, said bridgeformer being an alkylene diamine, said polymeric acid being selected from the group consisting of polyacrylic acid, polymethacrylic acid, polymaleic acid, a copolymer with




more than 5 Mol % acrylic acid, methacrylic acid or maleic acid monomer building blocks, and a combination thereof, said regenerated cellulose having an average molecular weight of between 80,000 and 150,000 and said polymeric acid having an average molecular weight of between 50,000 and 500,000.

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**5,035,802**

**MEMBRANE FILTER MATERIAL HAVING EXCELLENT ORGANIC SOLVENT RESISTANCE, METHOD FOR FORMATION OF MEMBRANE FILTER AND PROCESS FOR PREPARATION OF BISMALEIMIDE POLYMER TO BE USED FOR MEMBRANE FILTER**

**Kazuyuki Yamasaki, Chiba; Kimio Yamamoto, Ichihara; Masanobu Watanabe, Ichihara; Kojiro Kan, Ichihara, and Yoshio Nakayama, Ichihara, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan**

**Division of Ser. No. 396,976, Aug. 22, 1989, Pat. No. 4,983,717. This application Oct. 31, 1990, Ser. No. 607,283**

**Claims priority, application Japan, Aug. 23, 1988, 63-207243; Aug. 23, 1988, 63-207244; Sep. 22, 1988, 63-238448**

**Int. Cl.[5] B01D** *29/00*

**U.S. Cl. 210—440** **12 Claims**

1. A membrane filter material having an excellent organic solvent resistance, which comprises a bismaleimide polymer formed by reacting a bismaleimide compound with a perhydrodiaza heterocyclic compound represented by the following formula:

wherein $R_1$, $R_2$, $R_3$ and $R_4$ represent a lower carbon chain which is linear or contains a methyl group or ethyl group on the side chain, Y is >R< or >N-R-N< in which R is a lower carbon chain, and m is 0 or 1.

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**5,035,803**

**HIGH YIELD WATER-SOLUBLE POLYMER SILICA SEPARATION RESINS**

**Yoram Cohen, Los Angeles, Calif., assignor to The Regents of the University of California, Berkeley, Calif.**

**Filed Feb. 14, 1989, Ser. No. 310,744**

**Int. Cl.[5] C02F** *1/28;* **B01D** *15/04;* **B01J** *20/10*

**U.S. Cl. 210—656** **8 Claims**

1. A solid separation resin consisting essentially of silica particles which are surface activated by having chemically bonded to the surface thereof vinyl hydroxysilane in an amount of at least 10 micromoles of said vinyl hydroxysilane per square meter of said silica particles, said vinyl hydroxy silane having been formed by hydrolysis of a vinyl terminated

lower alkoxy silane attached to said silica particle, said surface activated silica particles having graft polymerized to the vinyl hydroxysilane a water soluble vinyl polymer in an amount of at least 2 milligrams of said water soluble vinyl polymer per square meter of said silica.

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5,035,804

## OIL SPILL WATER TREATMENT

Gene B. Stowe, Mesa, Ariz., assignor to clnZall Corporation, Scottsdale, Ariz.

Filed Sep. 17, 1990, Ser. No. 583,294
Int. Cl.[5] B01D *15/00*
U.S. Cl. 210—671 35 Claims

33. A method for removing oil from the surface of water comprising the steps of:

a. providing a particulate material having a specific gravity less than 1 and having an oleophilic, hydrophobic carbonized coating comprising a mixture of sulfur, ferrous sulfate, and sodium nitrate, and burned hydrocarbon oil;

b. applying said particulate material to the oil on said water surface to cause adsorption of said oil on the surface of said particulate material;

c. removing said particulate material, with the oil adsorbed thereon, from the surface of said water; and

d. stripping said adsorbed oil from said particulate material, thereby rendering said particulate material available for further use in removing oil from the surface of water.

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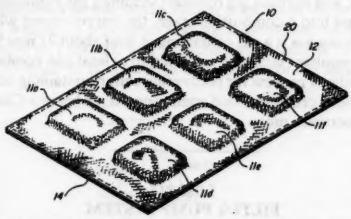
5,035,805

## WATER DETECTION AND REMOVAL FOR INSTRUMENTS

Clarence S. Freeman, and Katherine M. Freeman, both of Channelview, Tex.

Continuation of Ser. No. 173,304, Mar. 25, 1988, abandoned, which is a continuation-in-part of Ser. No. 735,792, May 17, 1985, Pat. No. 4,747,960. This application May 9, 1989, Ser. No. 352,662
The portion of the term of this patent subsequent to May 31, 2005, has been disclaimed.
Int. Cl.[5] B01D *15/00, 53/14*
U.S. Cl. 210—689 15 Claims




1. A method of absorbing moisture in the form of water vapor, water condensate, or invasive liquid water from within an enclosure containing moisture sensitive electronic instruments or electronic equipment comprising:

packaging a water absorbent polymer into multiple compartments between sheets of a material that is sufficiently porous to allow passage of water in liquid or vapor form that are cut and bonded to form a packet for use in the enclosure from which moisture is to be absorbed;

inserting the packet into an enclosure containing moisture sensitive electronic instruments or electronic equipment from which moisture is to be absorbed;

allowing the packet to remain within the enclosure to absorb moisture in the form of water vapor, water condensate, or invasive liquid water therefrom; and

when the packet is swollen from absorption of water, replacing the packet with another packet.

5,035,806

## SCALING SALT THRESHOLD INHIBITION AND DISPERSION WITH HYDROPHILIC/HYDROPHOBIC POLYMERS

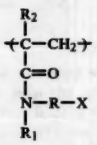
Dodd W. Fong, Naperville, and John E. Hoots, St. Charles, both of Ill., assignors to Nalco Chemical Company, Naperville, Ill.

Continuation of Ser. No. 351,827, May 15, 1989, abandoned.
This application Sep. 28, 1990, Ser. No. 590,334
Int. Cl.[5] C02F *5/12*
U.S. Cl. 210—701 8 Claims

1. A method of reducing the accumulation of calcium phosphonate deposits in an industrial water system that contains soluble ions of at least one species that normally forms calcium phosphonate deposits in a pH environment of a pH greater than 7.0, comprising:

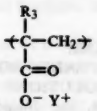
adding to the water of said industrial water system at least an amount of a water soluble polymer effective for calcium phosphonate deposit reduction, said polymer comprised of mer units of Formulas I, II, and III, wherein:

Formula I



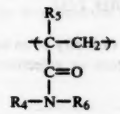
wherein $R_2$ is hydrogen or methyl, $R_1$ is hydrogen, R is methylene, and X is sulfonate;

Formula II



wherein $R_3$ is hydrogen or methyl, and Y is hydrogen or an alkali metal, alkaline earth metal, or ammonium cation; and

Formula III



wherein $R_5$ is hydrogen or methyl, $R_4$ is hydrogen and $R_6$ is t-butyl;

wherein said polymer is comprised of from about 10 to about 25 mole percent of said units of said Formula I, from about 55 to about 85 mole percent of said units of said Formula II, and from about 5 to about 20 mole percent of said units of said Formula III, and has a molecular weight of from about 3,000 to about 50,000 wherein said units of Formula II are comprised of from 5 to 30 mole percent methacrylic acid and salts thereof, and the remainder of said units of Formula II being acrylic acid and salts thereof.

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5,035,807

## WATER TREATMENT FOR SULFATE ION REMOVAL

Johannes P. Maree, Pretoria, South Africa, assignor to CSIR, Pretoria, South Africa

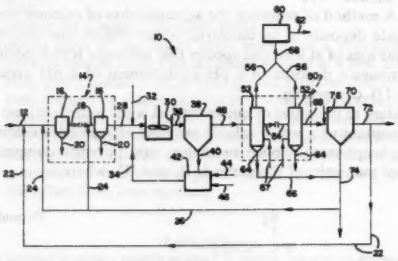
Filed Mar. 14, 1990, Ser. No. 493,320
Claims priority, application South Africa, Mar. 15, 1989, 89/1972
Int. Cl.[5] C02F *1/52*
U.S. Cl. 210—711 13 Claims

11. A chemical process for the treatment of water containing

dissolved calcium, heavy metal and sulfate ions, so as to produce a purified produce water having a reduced sulfate ion concentration, the process comprising the steps of:

adding barium sulfide to the water to cause precipitation of barium sulfate from the water,

treating the water from which the barium sulfate has been precipitated with carbon dioxide to form hydrogen sulfide in the water; and



stripping the hydrogen sulfide from the water, the process including the step whereby, no later than the barium sulfide addition to the water at least part of the hydrogen sulfide stripped from the water is passed through the water to cause precipitation of heavy metal ions from the water as their sulfides.

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**5,035,808**

## FLOCCULATION OF SUSPENDED SOLIDS FROM AQUEOUS SOLUTIONS

**Denis E. Hassick, Monroeville, and Joseph P. Miknevich, Coraopolis, both of Pa., assignors to Calgon Corporation, Pittsburgh, Pa.**

**Continuation of Ser. No. 207,353, Jun. 15, 1988, abandoned, which is a continuation of Ser. No. 22,180, Mar. 5, 1987, abandoned. This application Sep. 12, 1989, Ser. No. 405,907**

**Int. Cl.[5] C02F *1/54***

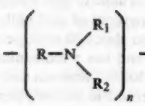
**U.S. Cl. 210—728** **6 Claims**

1. A method for reducing the turbidity of an aqueous system comprising adding to said system an effective amount of a composition comprising:

(a) ferric sulfate; and

(b) at least one water-soluble polymer selected from the group consisting of:

(i) water-soluble polyamines represented by structure I



(I)

wherein $R_1$ and $R_2$, which may be the same or different, are selected from the group consisting of straight or branched $C_1$–$C_8$ alkyl, substituted straight or branched $C_1$–$C_8$ alkyl and hydrogen; wherein R is selected from the group consisting of straight or branched $C_1$–$C_8$ alkyl and substituted straight or branched $C_1$–$C_8$ alkyl; and wherein n ranges from 2–50,000; and

(ii) water-soluble $C_1$–$C_8$ dialkyl diallyl ammonium polymers;

or comprising (a) ferric chloride; and (b) said water-soluble polyamine with structure (I); wherein the ratio (a) : (b), on a weight basis, is at least 5:1.

**5,035,809**

## DICHLOROMETHANE ABATEMENT

**Arunas V. Kavaliunas, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Oct. 5, 1990, Ser. No. 593,845**

**Int. Cl.[5] B01D *21/01***

**U.S. Cl. 210—728** **7 Claims**

1. A method of removing dichloromethane from an effluent stream of a chemical process comprising contacting the stream containing dichloromethane with an aqueous solution of an alkali metal alkylene ether glycolate to form an alkali metal chloride salt and solid reaction product, and separating the salt and reaction product from said effluent stream.

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**5,035,810**

## PROCESS FOR TREATING WASTEWATER WHICH CONTAINS SOUR GASES

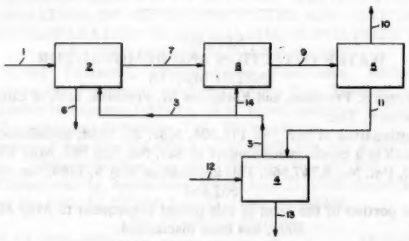
**Michael Heisel, Gistlstrasse 54, 8023 Pullach, and Josef Sporer, Fasanenweg 5, 8121 Wielenbach, both of Fed. Rep. of Germany**

**Filed Dec. 15, 1989, Ser. No. 450,311**

**Claims priority, application Fed. Rep. of Germany, Dec. 17, 1988, 3842599**

**Int. Cl.[5] B01D *19/00*; C02F *1/20, 1/58, 1/74***

**U.S. Cl. 210—750** **15 Claims**



1. In a process for the treatment of wastewater containing dissolved sour gas consisting essentially of $SO_2$ and essentially free of $H_2S$, comprising stripping the wastewater with a stripping gas, and introducing resultant stripping gas containing the sour gases into a combustion stage, the improvement wherein the stripping gas is a gas containing at least about 21 mol % $O_2$, and the resultant stripping gas is fed to at least one combustion stage within a process for recovering sulfur-containing components from a crude gas, said combustion stage being a Claus tail gas incineration unit.

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**5,035,811**

## FILTER PUMP SYSTEM

**David H. Grondin, Columbia, and Irene M. Schade, East Hartford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed Sep. 21, 1989, Ser. No. 410,196**

**Int. Cl.[5] B01D *37/00***

**U.S. Cl. 210—806** **4 Claims**

1. A device for filtering liquids, wherein said liquids are selected from the group consisting of slurry, oil, coolant, and paint, consisting essentially of:

a. an initial filter;

b. an intake hose connected to said initial filter;

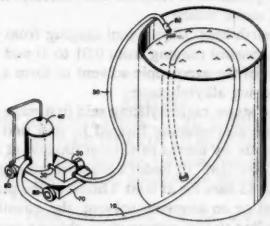
c. a pump;

d. a filter outlet hose, wherein said filter outlet hose connects said initial filter to said pump;

e. a final filter;

f. a pump outlet hose, wherein said pump outlet hose connects said pump to said final filter;

g. a cart, wherein the filtering device is mounted on said cart for easy mobility;



whereby the liquid passes through the intake hose, the initial filter, the filter outlet hose, the pump, the pump outlet hose, the final filter and is then deposited back into the tank.

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**5,035,812**

## THERMOSTABLE POLYMERS

**Alois Aignesberger, Trostberg; Josef Weichmann, Pleiskirchen; Johann Plank, Trostberg, and Manfred Bichler, Engelsberg, all of Fed. Rep. of Germany, assignors to SKW Trostberg Aktiengesellschaft, Trostberg, Fed. Rep. of Germany**

**Continuation of Ser. No. 146,311, Jan. 21, 1988, abandoned. This application May 2, 1990, Ser. No. 522,505**

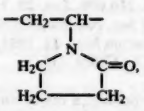
**Claims priority, application Fed. Rep. of Germany, Jan. 21, 1987, 3701600**

**Int. Cl.[5] C09K *7/02***

**U.S. Cl. 252—8.51** **6 Claims**

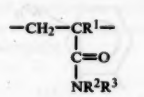
1. A method for preventing water loss in aqueous systems which comprises adding to the system from about 0.1 to about 10% by weight of a polymer having a molecular weight of from 10,000 to 2,000,000 and consisting essentially of

41 to 57 mole % of structural components of the formula



(I)

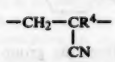
13 to 18 mole % of structural components of the formula



(II)

wherein $R^1$, $R^2$ and $R^3$, independently of one another, are hydrogen or methyl, and

30 to 41 mole % of structural components of the formula



wherein $R^4$ is hydrogen or methyl.

**5,035,813**

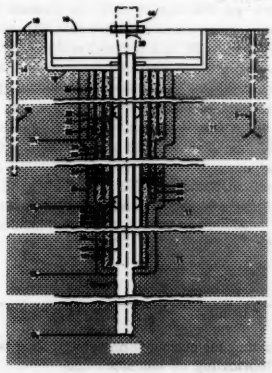
## PROCESS AND COMPOSITION FOR TREATING UNDERGROUND FORMATIONS PENETRATED BY A WELL BOREHOLE

**Jian-Chyun Shen, Irvine, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.**

**Filed Dec. 30, 1988, Ser. No. 292,529**

**Int. Cl.[5] C09K *7/02***

**U.S. Cl. 252—8.551** **33 Claims**



1. An aqueous fluid for treating an underground formation penetrated by a well borehole, the fluid comprising:

(a) water;

(b) lime in amount of between 10 and about 30 percent by weight of the total amount of water in the fluid;

(c) glycerol in an amount of between about 5 and about 50 percent by weight of the total amount of water in the fluid; and

(d) sugar in the amount of between about 1 and about 20 percent by weight of the total amount of water in the fluid, wherein the combined amount of glycerol and sugar in the fluid is between about 6 and about 50 percent by weight of the total amount of water in the fluid.

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**5,035,814**

## LIQUID DETERGENT HAVING IMPROVED SOFTENING PROPERTIES

**Heidrun E. Maaser, Monmouth Junction, N.J., assignor to Colgate-Palmolive Company, Piscataway, N.J.**

**Division of Ser. No. 823,906, Jan. 30, 1986, abandoned. This application Jun. 29, 1987, Ser. No. 68,781**

**Int. Cl.[5] B06M *1/00*; C11D *1/83***

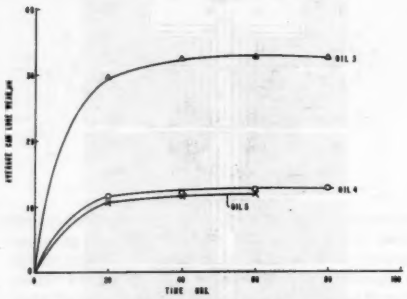
**U.S. Cl. 252—8.7** **18 Claims**

1. A method of simultaneously cleansing and softening fabrics without reducing brightener and detergency performance which comprises treating fabrics with an aqueous liquid detergent composition consisting essentially of about 6 to 30% by weight of a $C_8$–$C_{23}$ alkyl mono- or polyglycoside as the sole softening agent in a nonionic-anionic surfactant system consisting of a major amount of about 15–30% by weight of a nonionic surfactant and a lesser amount of about 4–12% of an anionic surfactant, in the wash cycle of the laundering operation.

## 5,035,815
## LUBRICATING OIL CONTAINING A NICKEL ALKOXYALKYLXANTHATE AND ZINC DIALKYLDITHIOPHOSPHATE

**Jacob J. Habeeb, Westfield, N.J.; Gopal H. Singhal; Rustom M. Billimoria, both of Baton Rouge, La., and William H. Stover, Sarnia, Canada, assignors to Exxon Research and Engineering Company, Florham Park, N.J.**

**Filed Sep. 7, 1989, Ser. No. 404,246**
**Int. Cl.[5] C10M** *135/14, 137/06*
**U.S. Cl. 252—32.7 E** **9 Claims**




1. A lubricating oil composition which comprises a major amount of a lubricating oil basestock and

(a) from about 0.2 to about 1.5 wt. % of a metal alkoxyalkylxanthate having the formula

$$(R_1{-}O{-}R_2{-}O{-}\overset{\overset{S}{\|}}{C}{-}S)_n M_x^m O_y S_z$$

where

$R_1$ is an alkyl group having from 2 to 4 carbon atoms,

$R_2$ is a straight alkylene group having from 2 to 4 carbon atoms,

M is nickel,

m is 2,

n is 2,

x is 1,

x+y is 0; and

(b) from 0.3 to about 1 wt. % of zinc dialkyldithiophosphate, wherein the amounts of (a) and (b) are synergistically effective in improving the antiwear properties of the lubricating oil composition.

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## 5,035,816
## PROCESS FOR PREPARING SUPERALKALINIZED DETERGENT-DISPERSANT ADDITIVES FOR LUBRICATING OILS

**Savino Leone, Tassin Dela Demi-Lune, France, assignor to Orogil, France**

**Filed Sep. 20, 1988, Ser. No. 247,016**
**Claims priority, application France, Dec. 23, 1987, 87 18014**
**Int. Cl.[5] C10M** *135/06*
**U.S. Cl. 252—40.5** **9 Claims**

1. Process for preparing alkylsalicylate-containing superalkalinized detergent-dispersant additives comprising the following stages:

a. In a first stage, neutralizing an alkylphenol by means of an alkaline earth base in the presence of at least one acid selected from the group consisting of the $C_1$–$C_{18}$ aliphatic carboxylic acids, benzoic acid, benzoic anhydride or the mineral acids, wherein water is formed, and an azeotropic solvent forming an azeotrope with said water, said phenol having one or more $C_8$–$C_{30}$ alkyl substituents, and said azeotropic solvent selected from the group consisting of (1) the aromatic hydrocarbons (2) the aliphatic hydrocarbons, and (3) the monoalcohols with a boiling point above 120° C., said neutralization being carried out at a temperature at least equal to that of the formation of said azeotrope, the quantities of reagents used corresponding to the following molar ratios:

Alkaline earth base/alkylphenol ranging from 0.1 to 2

Acid/alkylphenol ranging from 0.01 to 1; and

distillation of the azeotropic solvent to form a first product comprising alkylphenate;

b. in a second stage, carboxylating said first stage product to convert the alkylphenate formed in said first stage into alkylsalicylate by means of carbon dioxide at a temperature from 100°–185° C. under a pressure from atmospheric pressure to 15 bars for at least 3 hours in the presence of a dilution oil or an aromatic solvent, the quantity of $CO_2$ corresponding to that necessary to obtain a conversion of said alkylphenol into alkylsalicylate expressed as acid between approximately 5 and 50%, to form a second product;

c. in a sulfurization-superalkalinization stage, sulfurizing said second product obtained with elemental sulfur in the presence of an alkaline earth base, an alkylene glycol and an azeotropic solvent selected from the group consisting of (1) the aromatic hydrocarbons, (2) the aliphatic hydrocarbons, and (3) the monoalcohols with a boiling point greater than 120° C. and preferably greater than 150° C., at a temperature of about 140° to 230° C., the quantities of reagents used corresponding to the following molar ratios;

sulfur/alkylphenol ranging from 0.7 to 1.5, alkaline earth base/alkylphenol of at least 1.7,

superalkalinization alkaline earth base/alkylene glycol ranging from 1 to 1.6, to form a third product and

carboxylating said third product with a quantity of carbon dioxide at a temperature of 100°–185° C. and under about atmospheric pressure, said quantity of $CO_2$ being between that amount of $CO_2$ which is completely absorbed by the reaction medium and a 30% excess of said amount;

d. eliminating the alkylene glycol and the azeotropic solvent after addition of dilution oil;

e. filtering; and

f. collecting the product of the process.

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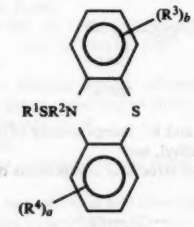
## 5,035,817
## N-SUBSTITUTED THIO ALKYL PHENOTHIAZINES

**Mary F. Salomon, Cleveland Heights, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio**

**Continuation of Ser. No. 610,595, Nov. 8, 1990, which is a continuation of Ser. No. 568,105, Aug. 16, 1990, which is a continuation of Ser. No. 210,609, Jun. 23, 1988, abandoned, which is a continuation of Ser. No. 908,077, Sep. 16, 1986, Pat. No. 4,785,095. This application Mar. 11, 1991, Ser. No. 667,731**
**Int. Cl.[5] C10M** *135/36*
**U.S. Cl. 252—47.5** **10 Claims**

1. A composition, comprising: a major amount of an oil of lubricating viscosity, and a composition of the formula:




wherein $R^1$ is selected from the group consisting of higher alkyl, or an alkenyl, aryl, alkaryl and aralkyl and mixtures thereof; $R^2$ is alkylene, alkenylene, and aralkylene and mixtures

thereof; $R^3$ and $R^4$ are independently alkyl, alkenyl, aryl, alkaryl, aralkyl, halogen, hydroxyl, alkoxy, alkylthio, arylthio, fused aromatic rings and mixtures thereof; and a and b are independently 0 or greater.

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5,035,818

## AMIDE AND SULFONIC ACID DERIVATION OF LOWER OLEFIN OLIGOMERS

Catherine S. H. Chen, Berkley Heights, and Paul G. Rodewald, Rocky Hill, both of N.J., assignors to Mobil Oil Corporation, Fairfax, Va.

Filed Feb. 7, 1990, Ser. No. 476,082
Int. Cl.[5] C10M *135/10, 105/72*
U.S. Cl. 252—47.5 5 Claims

1. A process for the production of liquid lubricant or lubricant additive comprising;

contacting a mixture comprising an alkylnitrile and alkene oligomer containing greater than twenty carbon atoms with sulfuric acid catalyst under amidation and sulfonation reaction conditions, said alkene oligomer comprising the oligomerization product of lower alkene oligomerized in contact with medium pore, shape selective metallosilicate catalyst under oligomerization conditions;

separating the reaction product and recovering said liquid lubricant or additive containing amide and sulfonic acid groups.

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5,035,819

## DISPERSANT, VI IMPROVER, ADDITIVE AND LUBRICATING OIL COMPOSITION CONTAINING SAME

Thomas F. DeRosa, Passaic, N.J.; Benjamin J. Kaufman, Hopewell Junction, and Rosemary J. Jennejahn, Nelsonville, both of N.Y., assignors to Texaco, Inc., White Plains, N.Y.

Filed Feb. 9, 1990, Ser. No. 479,008
Int. Cl.[5] C10M *107/48, 153/02*
U.S. Cl. 252—49.9 13 Claims

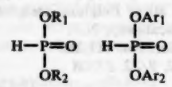
1. A method of preparing an additive composition for lubricating oils comprising:

(a) reacting

(i) reacting a polymer prepared from ethylene and at least one ($C_3$–$C_{10}$) alpha-monoolefin comprising from about 15 to 80 mole percent of ethylene and from about 20 to 85 mole percent of said ($C_3$–$C_{10}$) alpha-monoolefin, and said polymer having a number average molecular weight ranging from about 5,000 to about 500,000; and

(ii) 2-isocyanoethylacrylate which has a reactive pendant 2-isocyanoethylacrylate within its structure, to provide an intermediate; and

(b) reacting said intermediate with a phosphite compound selected from the group consisting of dialkyl phosphite or diaromatic phosphite



in which $R_1$ and $R_2$ is an alkyl group having from 1 to 15 carbon atoms, or a ($C_5$–$C_{10}$) cyclic group, and Ar is an aromatic ring containing at least two substituents per aromatic ring, to provide said additive composition; and

(c) recovering said additive composition.

5,035,820

## OIL COMPOSITIONS CONTAINING MODIFIED STAR POLYMERS

Robert B. Rhodes, Houston, Tex., and Rudolf J. A. Eckert, Huffelsheim, Fed. Rep. of Germany, assignors to Shell Oil Company, Houston, Tex.

Filed May 15, 1990, Ser. No. 523,517
Int. Cl.[5] C10M *149/00*
U.S. Cl. 252—50 13 Claims

1. A modified star polymer concentrate, produced by the process of:

mixing a mineral oil with at least 6% by weight of a star polymer, the star polymer comprising a poly(polyvinyl aromatic) nucleus bearing 4 to 30 arms comprising a hydrogenated, conjugated diene, each arm having a number average molecular weight from 10,000 to 100,000; and

reacting the mixture with N-vinylimidazole (NVI) or a combination of N-vinylimidazole and N-vinylpyrrolidone (NVP) in the presence of a free radical initiator, the wt. NVI×100/wt. polymer reactant value being between about 3.0 and about 5.5% when NVI is the sole reactant and a value between about 1.0 and about 5.0% when NVI is combined with NVP.

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5,035,821

## END-CAPPED MULTIFUNCTIONAL VISCOSITY INDEX IMPROVER

David Y. Chung, Edison, and John E. Johnston, Westfield, both of N.J., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed Jul. 18, 1988, Ser. No. 220,311
Int. Cl.[5] C10M *105/22*
U.S. Cl. 252—51.5 A 29 Claims

1. Oil soluble composition of stabilized molecular weight useful as viscosity index improver-dispersant additive for oleaginous compositions capable of providing oleaginous compositions exhibiting improved low temperature viscometric properties comprising reaction product of:

(a) and oil soluble ethylene copolymer comprising from about 15 to 90 wt. % ethylene and from about 10 to 85 wt. % of at least one $C_3$ to $C_{28}$ alpha-olefin monomer, having a number average molecular weight of from about 5,000 to 500,000 and grafted with ethylenically unsaturated carboxylic acid material having 1 or 2 acid moieties or anhydride moiety;

(b) polyamine having at least two primary amino groups, or polyol;

(c) an amount of high functionality long chain hydrocarbyl substituted dicarboxylic acid or anhydride having an average functionality of at least 1.2 wherein said long chain hydrocarbyl is derived from olefin polymer having a number average molecular weight of from about 400 to about 10,000 effective to provide composition which when added to oleaginous composition is capable of providing oleaginous composition exhibiting improved low temperature viscometric properties relative to low functionality long chain hydrocarbyl substituted dicarboxylic acid or anhydride; and

(d) an amount of $C_{12}$ to about $C_{16}$ hydrocarbyl substituted dicarboxylic acid anhydride effective to stabilize the molecular weight of said oil soluble composition reaction product.

**5,035,822**

## COPOLYMER COMPOSITIONS PARTICULARLY USEFUL AS ADDITIVES FOR HYDROCARBON OILS

**Jacques Jarrin; Magali Robine, both of Rueil Malmaison, and Jean-Pierre Durand, Chatou, all of France, assignors to Institut Francais du Petrol, Rueil-Malmaison, France**

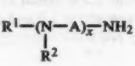
**Division of Ser. No. 60,785, Jun. 12, 1987, Pat. No. 4,882,404. This application Sep. 21, 1989, Ser. No. 410,220**

**Claims priority, application France, Jun. 13, 1986, 86 08697**

**Int. Cl.[5] C10M *149/12***

**U.S. Cl. 252—51.5 R** **16 Claims**

1. A lubricating composition comprising a major proportion of lubricating oil and a minor proportion, sufficient to improve the viscosity properties thereof, of at least one copolymer composition comprising (a) 55–99.8% by weight of recurrent units derived from at least one acrylic or methacrylic ester and (b) 0.2–10% by weight of recurrent units derived from at least one nitrogenous vinyl monomer obtained by reacting triallylcyanurate with at least one monoprimary or biprimary aliphatic amine, complying with the general formula:



wherein $R^1$ is a hydrogen atom or an alkyl radical $—C_nH_{2n+1}$, in which n is an integer from 1 to 24, x ranges from 1 to 10 or may be O when n is at least 4, $R^2$ is a hydrogen atom or an alkyl radical $—C_mH_{2m+1}$, m being an integer from 1 to 24, and A is an alkylene group of 2–6 carbon atoms, said nitrogenous vinyl monomer containing 1 or 2 triazine rings and comprising at least one allyl group; and (c) 0–35% by weight of a vinyl aromatic monomer.

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**5,035,823**

## REFRIGERANT COMPOSITIONS OF 1,11-TRIFLUOROETHANE

**Koji Tamura, Kawanishi; Hiroshi Kashiwagi, Settsu, and Masahiro Noguchi, Osaka, all of Japan, assignors to Daikin Industries, Ltd., Osaka, Japan**

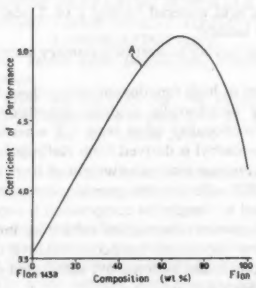
**PCT No. PCT/JP88/00952, § 371 Date May 19, 1989, § 102(e) Date May 19, 1989, PCT Pub. No. WO89/02456, PCT Pub. Date Mar. 23, 1989**

**PCT Filed Sep. 21, 1988, Ser. No. 362,385**

**Claims priority, application Japan, Sep. 21, 1987, 62-238441**

**Int. Cl.[5] C09K *5/04***

**U.S. Cl. 252—67** **3 Claims**




1. A working fluid for refrigerator consisting essentially of 90 to 5% by weight of 1,1,1-trifluoroethane and respectively 10 to 95% by weight of either chlorotetrafluoroethane or tetrafluoroethane.

**5,035,824**

## STREAMING POTENTIAL INHIBITOR FOR HYDRAULIC FLUIDS

**Hugh S/ MacKinnon, Hercules, Calif., assignor to Chevron Research Company, San Francisco, Calif.**

**Continuation of Ser. No. 329,743, Mar. 28, 1989, abandoned, which is a continuation of Ser. No. 158,178, Feb. 19, 1988, abandoned, which is a continuation of Ser. No. 68,075, Jan. 30, 1987, abandoned. This application Apr. 20, 1990, Ser. No. 511,494**

**Int. Cl.[5] C10M *135/10, 105/74***

**U.S. Cl. 252—75** **9 Claims**

1. An erosion-inhibited phosphate ester-based functional fluid comprising a major amount of a phosphate ester and from 10 to 50,000 parts per million by weight of calcium salt of an organic sulfonate, said functional fluid having been heated to a temperature and for a time sufficient to increase the conductivity of said fluid to at least 0.3$\mu$ mho/cm.

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**5,035,825**

## STABLE BLEACHING DETERGENTS CONTAINING STILBENE FLUORESCENT WHITENING AGENTS

**Claude Eckhardt, Riedisheim, France; Heinz Hefti, Reinach, Switzerland; Hans R. Meyer, Binningen, Switzerland, and Kurt Weber, Basel, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

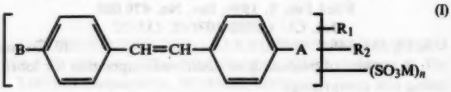
**Continuation-in-part of Ser. No. 275,241, Nov. 22, 1988, abandoned, and a continuation-in-part of Ser. No. 275,237, Nov. 22, 1988, abandoned. This application May 22, 1990, Ser. No. 526,870**

**Claims priority, application Switzerland, Nov. 26, 1987, 4599/87; Dec. 23, 1987, 5009/87**

**Int. Cl.[5] C11D *7/18, 7/38, 7/54, 7/60***

**U.S. Cl. 252—95** **12 Claims**

1. A storage-stable detergent containing 0.5 to 30% of an inorganic or organic peracid or salts thereof or mixtures of peracids or salts thereof, said peracid being capable of bleaching textiles at 20° C., and 0.03% to 0.5% of a fluorescent whitening agent or a mixture of fluorescent whitening agents wherein the fluorescent whitening agents are stilbene fluorescent whitening agents of the formula (I)




(I)

in which A is hydrogen, $—SO_3M$, halogen, phenyl or phenylpyrazol-1-yl; B is benzofuran-2-yl if A is hydrogen, 2-(stilben-4-yl)oxadiazol-5-yl if A is halogen, phenylpyrazol-1-yl if A is phenylpyrazol-1-yl, benzoxazol-2-yl if A is $—SO_3M$ or phenyl, or naphthoxazol-2-yl if A is hydrogen; $R_1$ and $R_2$ independently of one another are hydrogen, halogen, $C_1$–$C_4$-alkyl or $C_1$–$C_4$-alkoxy; M is hydrogen or one equivalent of a non-chromophoric cation and n is zero to 2, but the compound of formula (I) contains at least one $—SO_3M$ group.

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**5,035,826**

## LIQUID CRYSTAL DETERGENT COMPOSITION

**Patrick J. Durbut, Verviers; Myriam M. Mondin, Seraing, and Guy J. Broze, Grace-Hollogne, all of Belgium, assignors to Colgate-Palmolive Company, Piscataway, N.J.**

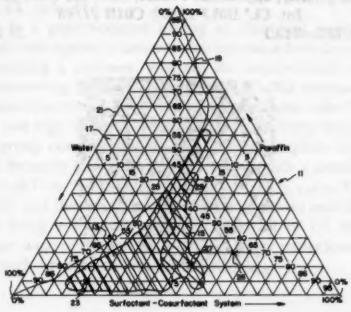
**Filed Sep. 22, 1989, Ser. No. 411,280**

**Int. Cl.[5] C11D *9/32, 9/22, 17/08***

**U.S. Cl. 252—121** **19 Claims**

1. A liquid detergent composition which is suitable for room temperature pre-treating and cleaning of materials soiled with lipophilic soil, and which is in liquid crystal form or is capable of being diluted with water and thereby being converted to liquid crystal form, which comprises about 5 to 40% of surface active agent, which is a mixture of nonionic and anionic deter-

gents wherein the anionic detergent is a $C_{4-12}$ alcohol ester of a sulfosuccinic acid salt, about 0.5 to 20% of a cosurfactant which is a lower alkylene glycol lower alkyl ether, with the proviso that the amount of cosurfactant is about 10 to 50% of the sum of the amounts of surfactant and cosurfactant, the sum of the surfactant and cosurfactant amounts is about 5 to 60% of the liquid detergent composition and the amount of the alcohol ester of sulfosuccinic acid salt is in the range of about 2 to 25% of the amount of nonionic detergent present, about 1 to 20% of lipophilic solvent selected from a group consisting of a hydro-




carbon, an ester of a higher alcohol and a lower carboxylic acid, an ester of a lower alcohol and a higher carboxylic acid, or mixture thereof, and about 40 to 90% of water, which liquid detergent composition is free of non-enzymatic materials of molecular weight greater than 5,000, is in liquid crystal form, is sprayable by a hand operated pump sprayer, the sprayed composition is adherent to vertical surfaces and spontaneously forms a microemulsion when it is brought into contact with lipophilic soil, which microemulsion is of a lower viscosity than the liquid crystal detergent composition.

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**5,035,827**

## LIQUID DETERGENT CONTAINING STABILIZED SILICATES

**Jeffrey A. Kosal, Midland County, Mich., assignor to Dow Corning Corporation, Midland, Mich.**

**Filed Dec. 5, 1989, Ser. No. 446,500**

**Int. Cl.[5] C11D** *3/04, 7/06, 17/00, 11/00*

**U.S. Cl. 252—135** **22 Claims**

1. In a liquid detergent having a pH of 6.5 to 8.5 including at least one surfactant selected from the group consisting of nonionic, anionic, cationic, ampholytic, and zwitterionic surfactants, the improvement comprising an additive for the liquid detergent which is a mixture of (i) a synthetic inorganic soluble alkali silicate of the formula

$$(MO)_aSiO_{4-a/2}$$

wherein a is an integer between one and three, and M is a cation selected from the group consisting of alkali metal cations and tetraorganoammonium cations, and (ii) an anionic siliconate of the formula

$$(MO)_aO_{(3-a)/2}Si\text{-}R\text{-}Y_b$$

wherein Y represents an alkali metal salt of an oxyacid; R is an organic linking group; Y is positioned at least two carbon atoms removed from the silicon atom; a has a value of from one to three, b is an integer from one to three, and M is an alkali metal cation or hydrogen.

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**5,035,828**

## SOLVENTS CONTAINING DICHLOROTETRAFLUOROPROPANE

**Kohji Tamura, Kawanishi; Yukio Omure, Takatsuki, and Satoshi Ide, Osaka, all of Japan, assignors to Daikin Industries, Ltd., Osaka, Japan**

**Filed Dec. 19, 1989, Ser. No. 452,478**

**Claims priority, application Japan, Dec. 20, 1988, 63-322395; Dec. 22, 1988, 63-324521; Dec. 22, 1988, 63-324522**

**Int. Cl.[5] C11D** *7/30, 7/50;* **C23G** *5/028*

**U.S. Cl. 252—170** **6 Claims**

1. An azeotropic composition consisting essentially of 86.5–87.5% 1,3-dichloro-2,2,3,3-tetrafluoropropane and 13.5–12.5% methanol, respectively, having a boiling point of about 54.6° C. at normal pressure.

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**5,035,829**

## PAINT REMOVING COMPOSITIONS

**David W. Suwala, Flanders, N.J., assignor to GAF Chemicals Corporation, Wayne, N.J.**

**Division of Ser. No. 21,891, Mar. 4, 1987, Pat. No. 4,812,255. This application Dec. 20, 1988, Ser. No. 286,968**

**Int. Cl.[5] C11D** *7/08, 7/50, 7/26, 3/26*

**U.S. Cl. 252—170** **10 Claims**

1. A water soluble paint remover composition for removing uncured paint consisting essentially of:

(a) from about 5 to 35 weight percent of an organic acid having the formula RCOOH wherein R is hydrogen, lower alkyl having from 1 to lo carbon atoms, halogen substituted lower alkyl having from 1 to 10 carbon atoms, hydroxy alkyl and cyclic alkyl having from 4 to 6 carbon atoms, and alkali metals salt of said acids;

(b) from about 30 to 65 weight percent of an alkylene glycol ether; and

(c) from about 10 to 50 weight percent of a five member ring lactone or lactam.

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**5,035,830**

## BINARY AZEOTROPIC COMPOSITIONS OF HEXAFLUOROPROPYLENE/ETHYLENE CYCLIC DIMER WITH METHANOL OR ETHANOL

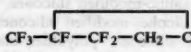
**Abid N. Merchant, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Mar. 21, 1990, Ser. No. 496,918**

**Int. Cl.[5] C09K** *3/30, 5/04;* **C11D** *7/30;* **C23G** *5/028*

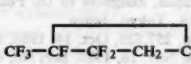
**U.S. Cl. 252—171** **16 Claims**

1. An azeotropic composition consisting essentially of about 82–92 weight percent hexafluoropropylene/ethylene cyclic dimer having a formula of



and about 8–18 weight percent methanol wherein the composition boils at about 53.4° C. when the pressure is adjusted to substantially atmospheric pressure.

2. An azeotropic composition consisting essentially of about 82–92 weight percent hexafluoropropylene/ethylene cyclic dimer having a formula of



and about 8–18 weight percent ethanol wherein the composition boils at about 61° C. when the pressure is adjusted to substantially atmospheric pressure.

5,035,831

## AZEOTROPE-LIKE COMPOSITIONS OF 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, NITROMETHANE, 1,2-DICHLOROETHYLENE, AND ETHANOL OR ISOPROPANOL

Hillel Magid; Ian R. Shankland; David P. Wilson, all of Williamsville; Kane D. Cook, Buffalo, and Earl A. E. Lund, West Seneca, all of N.Y., assignors to Allied-Signal Inc., Morris Township, N.J.

Filed Oct. 6, 1989, Ser. No. 417,991
Int. Cl.[5] C11N *7/30, 7/50;* C23G *5/028*
U.S. Cl. 252—171 15 Claims

1. Azeotrope-like compositions consisting essentially of from about 62.8 to about 68.4 weight percent 1,1,2-trichloro-1,2,2-trifluoroethane, from about 1.0 to about 3.0 weight percent isopropanol, from about 0.01 to about 1.0 weight percent nitromethane, and from about 30.0 to about 36.0 weight percent trans-1,2-dichloroethylene which boil at about 43.6° C. at 760 mm Hg.

7. Azeotrope-like compositions consisting essentially of from about 62.8 to about 68.4 weight percent 1,1,2-trichloro-1,2,2-trifluoroethane, from about 1.0 to about 3.0 weight percent isopropanol, from about 0.01 to about 1.0 weight percent nitromethane, and from about 30.0 to about 36.0 weight percent of a mixture of trans-1,2-dichloroethylene and cis-1,2-dichloroethylene wherein said cis-1,2-dichloroethylene is present in an amount of up to about 5 weight percent of said mixture which boil at about 43.6° C. at 760 mm Hg.

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5,035,832

## MILD LIQUID AQUEOUS DETERGENT COMPOSITIONS CONTAINING AN ALKYLSACCHARIDE SURFACE ACTIVE AGENT AND A SILICONE DERIVATIVE

Hiromi Takamura, Tokyo; Jun Kamegai, Ichikawa, and Hajime Hirota, Tokyo, all of Japan, assignors to KAO Corporation, Tokyo, Japan

Filed May 10, 1990, Ser. No. 521,845
Claims priority, application Japan, May 17, 1989, 1-123694
Int. Cl.[5] C11D *1/82, 3/22*
U.S. Cl. 252—174.15 7 Claims

1. A detergent composition comprising an alkylsaccharide surface active agent present in an amount of 1 to 50% and a silicone derivative present in an amount of 0.1 to 10%; wherein:

said alkylsaccharide surface active agent is a compound of the formula (I),

$$R_1—)—(R_2O)_t—(G)_p \quad (I)$$

wherein $R_1$ is a linear or branched alkyl, alkenyl, or alkylphenyl group having 6–18 carbon atoms, wherein $R_2$ is an alkylene group having 2–4 carbon atoms, G is a reduced saccharide residue having 5 or 6 carbon atoms, t is 0–10, and p is 1–10; and

said silicon derivative is a compound selected from the group consisting of dimethylpolysiloxanes, methylphenylpolysiloxanes, amino-modified silicones, fatty acid-modified silicones, alcohol-modified silicones, fatty acid alcohol-modified silicones, polyether-modified silicones, epoxy-modified silicones, fluorine-modified silicones, cyclic silicone, and alkyl-modified silicones.

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5,035,833

## BLOWING AGENT COMPOSITION FOR PREPARING A RIGID POLYURETHANE FOAM

Motosuke Ogawa; Hiromitsu Fukazawa, and Yasumasa Ogawa, all of Shimizu, Japan, assignors to Du Pont-Mitsui Fluorochemicals Co., Ltd., Tokyo, Japan

Division of Ser. No. 257,535, Oct. 14, 1988, abandoned. This application Nov. 16, 1989, Ser. No. 436,140
Claims priority, application Japan, Oct. 16, 1987, 62-259666
Int. Cl.[5] C09K *3/00*
U.S. Cl. 252—182.24 2 Claims

1. A stabilized pre-mix composition comprising for use in preparing a polyurethane foam, said composition 50 to 75 parts by weight of polyol and 50 to 25 parts by weight of a foaming agent which is a mixture of 1,1-dichloro-2,2,2,-trifluoroethane and n-hexane in a weight ratio of from 97:3 to 70:30.

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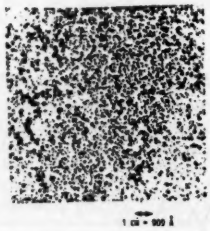
5,035,834

## NOVEL CERIUM (IV) COMPOUNDS

Jean-Yves Chane-Ching, Paris, and Jean-Luc Le Loarer, La Rochelle, both of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Mar. 26, 1987, Ser. No. 30,134
Claims priority, application France, Mar. 26, 1986, 86 04346
Int. Cl.[5] B01J *13/00;* C01B *21/48*
U.S. Cl. 252—313.1 39 Claims



1 cm = 909 Å

1. A cerium (IV) compound, directly dispersible in water, having the general Formula (I):

$$Ce(OH)_x(NO_3)_y \cdot pCeO_2 \cdot nH_2O \quad (I)$$

wherein x=4−y; y ranges from 0.35 to 1.5; p is greater than or equal to 0 and less than or equal to 2.0; and n is greater than or equal to 0 and less than or equal to about 20; and wherein the $NO_3^-$ to Ce ratio is from 0.35 to 0.7.

9. A process for the preparation of a cerium (IV) compound as defined by Formula (I):

$$Ce(OH)_x(NO_3)_y \cdot pCeO_2 \cdot nH_2O \quad (I)$$

wherein x=4 −y; y ranges from 0./35 to 1.5; p is greater than or equal to 0 and less than or equal to 2.0; and n is greater than or equal to 0 and less than or equal to about 20; and wherein the $NO_3^-$ to Ce ratio is from 0.35 to 0.7, comprising hydrolyzing an aqueous solution of a cerium (IV) salt in a nitric acid medium separating the precipitate which forms and optionally heat treating said precipitate.

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5,035,835

## MODULATORY MOLECULAR ELEMENT

Shiro Asakawa, Tokyo; Yasuhiko Machida, Yokohama; Akira Taomoto, Tokyo, and Katsuhiro Nichogi, Kawasaki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Mar. 16, 1988, Ser. No. 169,037
Claims priority, application Japan, Mar. 24, 1987, 62-69336
Int. Cl.[5] H01B *1/00*
U.S. Cl. 252—500 8 Claims

1. A modulatory molecular element comprising a one-dimensional molecule group of an organic $\pi$-electron system, said molecular group including at least two of the members selected from the group consisting of a charge transfer complex group having alternately-arranged donors and acceptors, a large cyclic metal complex group, and a chelate compound consisting of a metal ion and a ligand group, and electrodes between which said one-dimensional molecule group extends, said at least two members being arranged so that application of external energy on said one-dimensional molecular group causes a reversibly physical change in at least a portion of said

molecule group which physical change aries a conductive characteristic of said one-dimensional molecular group.

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5,035,836

## SOLID LUBRICATED RESISTIVE INK FOR POTENTIOMETERS

Michael N. Gardos, Los Angeles; Larry C. Lipp, Torrance, and William S. Griffin, Manhattan Beach, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jun. 19, 1989, Ser. No. 367,914

Int. Cl.[5] H01B *1/06;* H01C *1/06, 10/00*

U.S. Cl. 252—511 8 Claims

1. In a potentiometer having an electrical contact wiper which rubs against a resistive element made from a resistive ink comprising a polymer, wherein the improvement comprises incorporating into said resistive ink a solid lubricant which remains electrically conductive and lubricious under low moisture and high vacuum, said solid lubricant being selected from the group consisting of $MoSe_2$, $NbSe_2$, graphite intercalated with bromine and graphite intercalated with a metal chloride selected from the group consisting of $CdCl_2$, $CrCl_3$, $NiCl_2$, and $CuCl_2$, and the weight ratio of said polymer to said solid lubricant being within the range of about 5:1 to 1:1, to thereby reduce wear of the electrical contact wiper under low moisture and high vacuum conditions.

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5,035,837

## COPPER PASTE COMPOSITION

Shuji Saeki, Ohtsu; Masatoshi Suehiro; Masashi Echigo, both of Kyoto; Susumu Okada, Zushi, and Masami Sakuraba, Nagaokakyo, all of Japan, assignors to Dia-Ichi Kogyo Seiyaku Co., Ltd., Kyoto and Dowa Mining Co., Ltd., Tokyo, both of, Japan

Filed Jun. 28, 1990, Ser. No. 544,973

Claims priority, application Japan, Oct. 27, 1989, 1-280048

Int. Cl.[5] H01B *1/06;* C03C *8/16*

U.S. Cl. 252—512 16 Claims

1. A copper paste composition comprising about 95 to about 70 percent by weight of inorganic components and about 5 to about 30 percent by weight of organic vehicle components, said inorganic components comprising a powdered refractory material, and copper powder including cuprous oxide powder and cupric oxide powder in amounts such that about 10 to about 15 parts by weight of cuprous oxide powder, about 12 to about 17 parts by weight of cupric oxide powder, and about 7 to about 12 parts by weight of powdered refractory material, are included for each 100 parts by weight of copper powder.

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5,035,838

## NONIONIC SURFACTANT BASED LIQUID DETERGENT FORMULATION CONTAINING AN ALKENYL OR ALKYL CARBOXYSULFONATE COMPONENT

Connie L. Merrill, Katy, and Donald L. Wood, Houston, both of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Oct. 24, 1989, Ser. No. 426,148

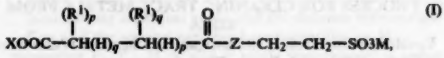
Int. Cl.[5] C11D *1/18, 3/065, 3/30*

U.S. Cl. 252—545 21 Claims

1. A nonionic surfactant based, stable single-phase, built, biodegradable, low-foaming liquid laundry detergent formulation, which consists essentially of

(a) between about 20 and about 30 percent by weight of one or more nonionic surfactants selected from the group consisting of alcohol ethoxylate surfactants and alkyl-substituted phenol ethoxylate surfactants having an average of between about 4 and 12 ethylene oxide units per ethoxylate molecule,

(b) between about 1 and about 10 percent by weight of one or more carboxysulfonate compounds of the formula



(I)

wherein $R^1$ is selected from the group consisting of alkenyl and alkyl groups having carbon numbers in the range of from about 9 to 18, p is either 0 or 1, q is o when p is 1 and q is 1 when p is 0, X is selected from the group consisting of a hydrogen atom and an M cation, Z is selected from the group consisting of an oxygen atom and —$N(R^2)$—groups wherein $R^2$ is $C_1$ to $C_4$ alkyl, and each M is a salt forming cation, with the further provision that the sum of components (a) and (b) is between about 21 and about 35 percent by weight,

(c) between 0 and about 20 percent by weight of a detergent builder,

(d) between about 2 and about 8 percent by weight of triethanol amine, and

(e) water.

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5,035,839

## COMPOSITIONS FORMING HYDROGEN BRIDGES

Dieter Dorsch, Darmstadt; Rudolf Eidenschink, Bodenheim; Bernhard Rieger, Pfungstadt, and Gerd Marowsky, Göttingen, all of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit Beschrünkter Haftung, Darmstadt, Fed. Rep. of Germany

PCT No. PCT/EP88/00091, § 371 Date Oct. 17, 1988, § 102(e) Date Oct. 17, 1988, PCT Pub. No. WO88/06304, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 8, 1988, Ser. No. 272,679

Claims priority, application Fed. Rep. of Germany, Feb. 17, 1987, 3704878

Int. Cl.[5] F21V *9/04;* C09K *19/52;* G02F *1/13*

U.S. Cl. 252—587 6 Claims

1. A composition having non-linear optical properties comprising:

a substrate;

a first layer containing at least one component having a hyperpolarizability of the second order differing from zero and which is applied to the surface of said substrate, wherein said at least one component of said first layer contains at least one donor substituent capable of forming a hydrogen bridge and at least one acceptor substituent capable of forming a hydrogen bridge, and wherein said at least one component of said first layer has a dipolar orientation and is attached to the surface of the substrate via a hydrogen bridge; and

at least one subsequent layer containing at least one component having a hyperpolarizability of the second order differing from zero situated on top of said first layer applied to said substrate, wherein said at least one component of said subsequent layer contains at least one donor substituent capable of forming a hydrogen bridge and at least one acceptor substituent capable of forming a hydrogen bridge, said at least one component of said subsequent layer has a dipolar orientation, and wherein said layers are also attached to one another via hydrogen bridges,

wherein said at least one component of each of said layers is independently 4-amino-4''-nitro-p-terphenyl, 4-(4-hydroxybutoxy)-4'-cyanobiphenyl, 4-(2-hydroxyethoxy)-4'-cyano-biphenyl, 4-{2-]4'-(6-hydroxyhexyloxy)-biphenyl-4'-yl]-ethenyl}-pyridine, 4-hydroxy-3-(11-methacryloyloxyundecyl)-phenyl 2-(4-(2-[4]-pyridylvinyl)-phenoxy)-acetate or 3-(11-methacryloyl-oxyundecyl)-4-(4-(2-hydroxyethoxy)-benzoyloxy)-phenyl 2-(4-(2-[4]-pyridylvinyl)-phenoxy)-acetate.

## 5,035,840
## PROCESS FOR CLEANING TRACE METALS FROM EDTA

**Yuval Halpern, Skokie, Ill., assignor to Chemical Waste Management, Inc., Oak Brook, Ill.**

**Filed Oct. 1, 1990, Ser. No. 591,548**
**Int. Cl.[5] G21F *9/08, 9/14***
**U.S. Cl. 252—632** **19 Claims**

6. A process for removing a radioactive metal salt contained in an $H_4EDTA$ precipitate comprising the following steps in combination:

(a) esterifying the $H_4EDTA$ precipitate containing radioactive metal salt in the presence of an esterification reagent and a non-protic organic solvent at a temperature of from about 0° C. to the lower boiling point temperature of either the non-protic organic solvent or the esterification reagent for a period of time ranging from 15 minutes to about 24 hours to produce an esterification reaction mixture comprising a solid radioactive metal salt, and an EDTA ester, and

(b) separating the solid radioactive metal salt from the esterification reaction mixture to produce a separated solid including a solid radioactive metal salt, and a clarified esterification reaction mixture.

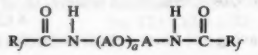
11. The process of claim 6 wherein the clarified esterification mixture is disposed of by incineration.

## 5,035,841
## TRIBLOCK AMIDE FLUOROSURFACTANTS

**Christine A. Costello, Easton, and John B. Dickenson, Fogelsville, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.**

**Filed May 2, 1989, Ser. No. 346,106**
**Int. Cl.[5] C09F *5/00, 7/00***
**U.S. Cl. 260—404.5** **22 Claims**

1. A compound of the formula:

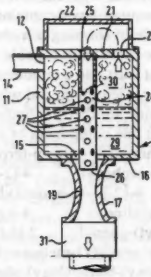


where $R_f$ is a perfluorinated $C_2$–$C_{20}$ hydrocarbyl group,
A is a $C_2$–$C_4$ alkylene group, and
a is an integer from 1 to 1000.

## 5,035,842
## FLUID MIXING OR HOMOGENIZATION

**Frank Mohn, London, England, assignor to Framo Developments (UK) Limited, London, England**

**Filed Jan. 16, 1990, Ser. No. 465,955**
**Claims priority, application United Kingdom, Jan. 16, 1989, 8900841**
**Int. Cl.[5] B01F *3/04***
**U.S. Cl. 261—76** **17 Claims**



1. An apparatus for receiving a multi-phase fluid from a source thereof and for homogenizing said multiphase fluid, said apparatus comprising:

a vessel,

inlet piping communicating between said source and an upper region of said vessel to form within said vessel a pool of liquid phase fluid from said source beneath a body of gaseous phase fluid from said source,

outlet piping extending from said vessel for discharging therefrom liquid phase fluid from said pool,

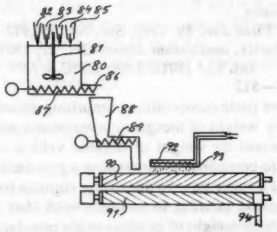
a constriction in said outlet piping forming a venturi, and

tubing communicating between said body of gaseous phase fluid and said outlet piping for mixing in said venturi gaseous phase fluid from said body thereof with liquid phase fluid discharging from said pool thereof through said outlet piping.

## 5,035,843
## METHOD FOR PRODUCING EXPLOSIVE SUBSTANCES

**Herman Schmid, Karlskoga, Sweden, assignor to Nobel Kemi AB, Sweden**

**Filed Jun. 20, 1990, Ser. No. 540,709**
**Claims priority, application Sweden, Jun. 21, 1989, 8902246**
**Int. Cl.[5] C06C *21/00***
**U.S. Cl. 264—3.2** **19 Claims**



1. Method for producing, by means of mixing, working and homogenizing, binder-containing castable or compressible explosive substance of high viscosity from a mixture containing crystalline explosive, or particulate explosive or both; at least one liquid or semi-liquid binder which is compatible with all of the other components in said mixture, and which is selected from the group consisting of thermosetting plastic, thermoplastic material and thermoelastic material; and optionally at least one optional component selected from the group consisting of action-enhancing additives, phlegmatizing agents and viscosity-reducing agents; and wherein the amount of said binder and optionally said viscosity-reducing agent is such that the mixture in the unworked state behaves like and essentially feels like a dry powder completely without inherent viscosity; which method comprises bringing the components of said mixture to the roll nip between the two helically grooved rolls of a mixing, shearing and rolling mill, wherein said rolls are arranged at an adjustable distance from each other and are counter-rotating at different speeds; then working said mixture between said rolls until the included air between the particles has been pressed out in sufficient amount so as to convert said mixture into a coherent mass of high viscosity; and then removing the coherent mass in a continuous form or in a newly formed particulate form associated therewith from the roll that is rotating the fastest.

## 5,035,844
## PROCESS FOR THE PRODUCTION OF MICROCAPSULES

Brian North, High Wycombe, England, assignor to The Wiggins Teape Group Limited, Hampshire, England

Filed Apr. 24, 1989, Ser. No. 341,817
Claims priority, application United Kingdom, Apr. 23, 1988, 8809648
Int. Cl.[5] B01J *13/10, 13/20*
U.S. Cl. 264—4.33 8 Claims

1. A process for the production of microcapsules by coacervation of gelatin with carboxymethylcellulose (CMC) and a second anionic colloid, comprising the steps of:

(a) forming an emulsion of a hydrophobic oil in an aqueous phase containing dissolved gelatin, CMC, and a second anionic colloid at a pH such that coacervation does not occur;

(b) acidifying the emulsion from step (a) to a pH such as to induce coacervation of the gelatin with the CMC and the second anionic colloid, with resultant deposition of liquid coacervate about the emulsified droplets of hydrophobic oil;

(c) chilling the acidified emulsion from step (b) so as to solidify the liquid coacervate and form solid-walled microcapsules each containing one or more droplets of hydrophobic oil; and

(d) cross-linking the solid microcapsule walls by means of a chemical cross-linking or hardening agent so as to render the microcapsule walls permanent;

characterized in that the CMC used has a viscosity in the range of from 50 to 140 mPas (cps), when measured in 6.0% by weight aqueous solution at 20° C. using a Brookfield RVT viscometer, Spindle No. 1, at 10 r.p.m., and in that the weight ratio of gelatin:CMC is from 1:0.14 to 1:0.05.

2. A process as claimed in claim 1 wherein the second anionic colloid is a maleic anhydride copolymer.

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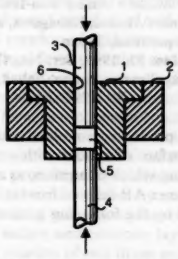
## 5,035,845
## POWDER PRESSING METHOD

Slawomir Gasiorek, Kane, Pa., assignor to KZK Powder Technologies Corporation, Middleburg Hts., Ohio

Continuation-in-part of Ser. No. 193,733, May 13, 1988, abandoned. This application Mar. 1, 1990, Ser. No. 486,869
Int. Cl.[5] B29C *43/02*
U.S. Cl. 264—40.1 13 Claims




1. A method of determining whether a given powder is suitable for producing pressed powder compacts, comprising the steps of:

providing a die having first and second ends, a constant cross-sectional area F, and a perimeter S;

providing a first punch that tightly fits within the first end of the die;

providing a second punch that tightly fits within the second end of the die;

closing the second end of the die by inserting the second punch into the second end of the die;

placing powder within the die;

inserting the first punch into the first end of the die and compressing the powder while maintaining the second punch stationary to form a compact, the force on the first punch being identified as $P_c$, the force on the second punch being identified as $P_d$, and the distance between the first and the second punches being identified as H;

measuring $P_c$, $P_d$, H, S, and F while the compact is under load;

removing the compact from the die in the direction of force on the first punch;

crushing the compact outside the die, the pressure force needed to crush the compact being identified as $W_s$;

calculating the cohesiveness of the compact by solving the following equation:

$$C=(W_sSH)/(P_c-P_d)$$

accepting the powder for use in production only if C is greater than or equal to 1.0.

8. A method of controlling the composition of powder used in pressed powder compacts, comprising the steps of:

providing a die having first and second ends, a constant cross-sectional area F, and a perimeter S;

providing a first punch that tightly fits within the first end of the die;

providing a second punch that tightly fits within the second end of the die;

closing the second end of the die by inserting the second punch into the second end of the die;

placing powder within the die;

inserting the first punch into the first end of the die and compressing the powder while maintaining the second punch stationary to form a compact, the force on the first punch being identified as $P_c$, the force on the second punch being identified as $P_d$, and the distance between the first and the second punches being identified as H;

measuring $P_c$, $P_d$, H, S, and F while the compact is under load;

calculating the slide coefficient of the powder by solving the following equation:

$$\eta=(P_d/P_c)^{4F/SH};$$

providing powder samples, each having different amounts of additives;

calculating the slide coefficient of each sample;

plotting a graph of slide coefficient versus powder composition;

providing a proposed powder sample;

calculating the slide coefficient of the proposed powder sample;

adjusting the composition of the proposed powder sample to produce a calculated slide coefficient falling within a predetermined range of the graph.

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## 5,035,846
## SYSTEM AND PROCESS FOR CONTINUOUS MANUFACTURE OF CELLULAR PRODUCTS SUCH AS LATEX FOAM MATTRESSES, CUSHIONS OR THE LIKE

Luciano Carotti, Seriate, Italy, assignor to Pirelli SAPSA S.p.A., Milan, Italy

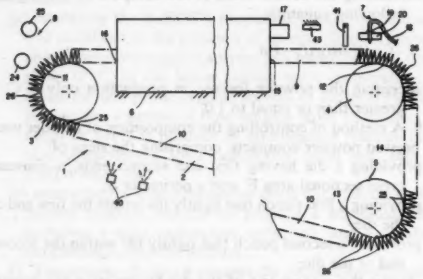
Filed Sep. 14, 1989, Ser. No. 407,334
Claims priority, application Italy, Sep. 15, 1988, 21950 A/88
Int. Cl.[5] B29C *67/22*
U.S. Cl. 264—48 13 Claims

1. A process for manufacturing products having surface recesses and formed of foamed material, said products being in the form of a continuous layer of unlimited length divisible into individual pieces of predetermined dimensions, said process comprising the steps of:

(a) continuously rotating an endless laying surface formed in a closed ring configuration oriented to include instantaneously a planar portion moving forward in a first direction and a return portion moving in a second direction

opposite to said first direction, said laying surface being provided with a plurality of conical protuberances;

(b) pouring foam material on said laying surface at a beginning portion of said planar portion in a direction transverse of said first direction to form on said laying surface a foam layer having a predetermined thickness and a plurality of recesses each of which comprises a base open adjacent to said laying surface and a cavity portion and



having a predetermined height which is less than a total thickness of said foam layer and;

(c) vulcanizing said foam layer at a position downstream of said beginning portion of said planar portion between a first position and a second position of said laying surface by supplying heat via pressurized stream which surrounds the foam layer, comes in contact with the foam layer, and enters said cavity portion through said base of said recesses.

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**5,035,847**

**MOLD FOR SLIP CASTING**

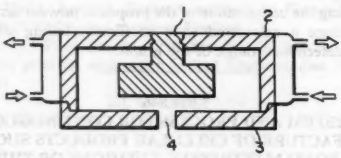
**Hiroaki Nishio, and Takeshi Kawashima, both of Tokyo, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan**

**Division of Ser. No. 192,224, May 10, 1988, abandoned. This application Feb. 5, 1991, Ser. No. 652,239**

**Claims priority, application Japan, Jun. 12, 1987, 62-145326**

**Int. Cl.[5] C04B *33/28***

**U.S. Cl. 264—86** **23 Claims**



1. A method for slip casting in a mold, comprising

casting slip into said mold which comprises at least one part adapted to be in contact with the slip cast into said mold, said at least one part being a compact comprising a mixture of an organic matter and a powder, said organic matter being capable of being extracted by a supercritical fluid and having a melting point of 0° to 150° C. and said powders being incapable of being extracted by the supercritical fluid, and solidifying said slip to form a solidified casting; and

contacting said solidified casting and said compact with a supercritical fluid to extract said organic matter from said compact whereby said compact disintegrates and thereby separates from said solidified casting.

**5,035,848**

**FILAMENT SEPARATION IN LIQUIDS**

**Stephen F. Bush, Poynton, United Kingdom, assignor to Prosyma Research Limited, Poynton, United Kingdom**

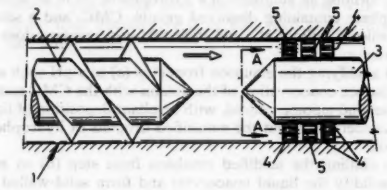
**PCT No. PCT/GB88/00304, § 371 Date Dec. 18, 1989, § 102(e) Date Dec. 18, 1989, PCT Pub. No. WO88/08365, PCT Pub. Date Nov. 3, 1988**

**PCT Filed Apr. 21, 1988, Ser. No. 424,286**

**Claims priority, application United Kingdom, Apr. 21, 1987, 8709445**

**Int. Cl.[5] B29B *15/08***

**U.S. Cl. 264—174** **23 Claims**



1. A method of separating filaments from at least one clump thereof which is provided in a liquid flow having a lateral extend, the filaments being present in substantially parallel relationship within the at least one clump, the method comprising the steps of:

pressurizing the liquid containing the at least one clump,

subdividing the flow across the lateral extend and passing the flow through an array of filament separating channels having a cross-section sufficiently large so as to accommodate the cross-section of the at least one clump, the cross-section of the separating channels constraining the at least one clump to move in an axial direction along the separating channels so that a uniaxial shearing force is applied to filaments at an edge of the flow in the separating channels to separate the filaments axially from each other and from filaments in a center of the at least one clump without substantial breakage of the separated filaments.

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**5,035,849**

**PROCESS FOR PRODUCING MOLDED ARTICLE USING A RELEASING AGENT**

**Katsuoki Uemura; Masaru Ando; Jun-Ichi Yamauchi, all of Chiba, and Yoshinori Akutsu, Kanagawa, all of Japan, assignors to Chisso Corporation, Japan**

**Filed Jan. 31, 1990, Ser. No. 472,801**

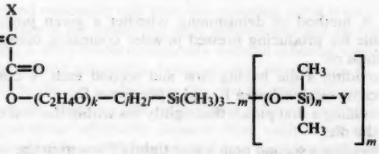
**Claims priority, application Japan, Feb. 1, 1989, 1-23327**

**Int. Cl.[5] B29C *33/64***

**U.S. Cl. 264—255** **20 Claims**

1. A process for producing a molded article comprising:

(a) coating the surface of a mold with a releasing agent for powder molding which comprises, as an essential component, a copolymer AB derived from at least one monomer A represented by the following general formula (I)



(I)

wherein X is a hydrogen atom or a methyl group, k is an integer of 0–5, l is an integer of 1–3, m is a integer of 1–3, n is an integer of 0–550 and Y is a methyl group or a fluorine atom-containing substituent having 1–20 carbon atoms,

and at least one vinyl-polymerizable monomer B containing

at least one alkyl acrylate or methacrylate wherein the alkyl group has 1–8 carbon atoms;

(b) heating the coated mold;

(c) allowing a powder of a non-rigid vinyl chloride resin containing a plasticizer to adhere to the heated mold to melt the powder;

(d) cooling the mold, releasing agent and powder to form a molded article; and

(e) peeling the molded article from the mold, monomer A and monomer B being combined in proportions within the copolymer AB such that the film of releasing agent has good compatibility with the vinyl chloride resin and sufficient releasibility from the mold such that the film migrates to the surface of the molded article at the time of peeling.

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**5,035,850**

## METHOD OF PRODUCING CONCRETE COMPOSITE PIPE

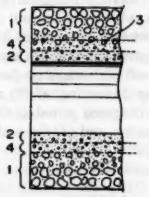
**Nobuyoshi Yoshikawa, Omiya, and Hiroshi Asano, Nagoya, both of Japan, assignors to Teikoku Hume Pipe Co., Ltd., Tokyo and Noritake Co., Limited, Nagoya, both of, Japan**

**Division of Ser. No. 168,869, Mar. 16, 1988, abandoned. This application Apr. 13, 1989, Ser. No. 337,633**

**Claims priority, application Japan, Mar. 24, 1987, 62-68034**

**Int. Cl.[5] B28B *1/20***

**U.S. Cl. 264—256** **5 Claims**




1. A method of producing a concrete composite pipe comprising the steps of

(a) rotating a drum mold about an axis thereof;

(b) casting concrete into said drum mold to shape said cast concrete into a concrete layer of a uniform thickness on an inner surface of said drum mold by means of a centrifugal force generated by said rotation of said drum mold;

(c) increasing said rotation of said drum mold to obtain an increased centrifugal force such that water is squeezed out of said concrete layer onto an inner surface thereof;

(d) stopping said rotation of said drum mold to remove said squeezed water from said concrete layer;

(e) resuming said rotation of said drum mold while casting a mixture of hydrophilic resin and a hardener thereinto to form a corrosion protective layer of said mixture on said inner surface of said concrete layer by means of a centrifugal force generated by said resumption of said rotation of said drum mold before said concrete layer solidifies;

(f) continuing said rotation of said drum mold while scattering aggregates including coarse and fine particles onto an inner surface of said corrosion protective layer before said concrete layer solidifies;

(g) increasing said rotation of said drum mold to increase said centrifugal force such that said coarse particles are caused to precipitate in said corrosion protective layer before said concrete layer solidifies and penetrate into said concrete layer to form a layer intermediate said concrete layer and said corrosion protective layer in the form of a layer of mixed resin, concrete and coarse particles, and such that said fine particles are distributed near said inner surface of said corrosion protective layer; and

(h) stopping said rotation of said drum mold after said corrosion protective layer is hardened.

**5,035,851**

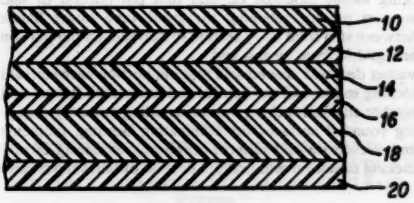
## METHOD OF MAKING VERY HIGH BARRIER FILM

**Henry G. Schirmer, Spartanburg, S.C., assignor to W. R. Grace & Co.-Conn., Duncan, S.C.**

**Continuation of Ser. No. 934,581, Nov. 25, 1986, abandoned. This application Jan. 18, 1991, Ser. No. 644,467**

**Int. Cl.[5] B29C *47/06, 55/12, 55/28;* B32B *31/30***

**U.S. Cl. 264—514** **4 Claims**




1. A method of producing an oxygen barrier film comprising:

(a) coextruding a multi-layer film comprising an outside ethylene vinyl alcohol copolymer layer, and at least one layer bonded to the outside layer and comprising a polymeric material selected from the group consisting of a polyolefin or chemically modified polyolefin and a vinylidene chloride copolymer;

(b) quenching the coextruded film in a col water bath;

(c) softening and wetting the ethylene vinyl alcohol copolymer layer by passing the coextruded film through water at a temperature of between about 180° F. and 212° F.; and

(d) orienting the heated film.

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**5,035,852**

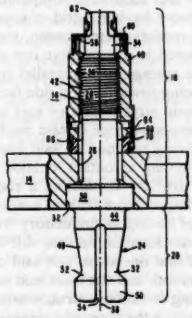
## TAPERED LEAF SUPPORT PIN FOR OPERATING PLANT GUIDE TUBES

**John T. Land; Ronald J. Hopkins, both of Pensacola, and Daniel E. Ford, Cantonment, all of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Jul. 7, 1989, Ser. No. 376,771**

**Int. Cl.[5] G21C *7/00***

**U.S. Cl. 376—353** **22 Claims**



21. A mounting system for removably mounting the lower flange of a control rod guide tube over an opening in the upper core plate of a nuclear reactor comprising at least one elongated support pin mounted on the guide tube lower flange and resiliently receivable in a bore formed in the upper core plate, wherein said mounting system comprises:

a support pin having a longitudinal axis and comprising a first pin portion mountable on the guide tube lower flange, and a second pin portion receivable within said upper core plate bore, said second pin portion including a solid body

section adjacent said first pin portion and having an outer diameter which is accommodated by said bore by a close clearance fit, and a split leaf section including a split intermediate section extending from said solid body section and having a tapered outer diameter less than the outer diameter of said solid body section for reducing stress in said split leaf section, and a split end section extending from said split intermediate section and biasingly engaging at least a portion of the wall of said bore;

locking means mounted on said first pin portion of said support pin for retaining the guide tube lower flange between said solid body section of said second pin portion and said locking means; and

a washer disposed around said first pin portion between said locking means and the control rod guide tube flange, said washer and said locking means including mutually engaging rounded surfaces for eliminating bending moments and stresses on said support pin during mounting of said locking means on said first pin portion of said support pin.

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**5,035,853**

## NUCLEAR REACTOR FUEL ASSEMBLY

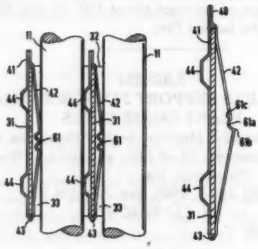
**Hans Lettau, Effeltrich, and Roland Rink, Bad Koenigshofen, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Feb. 21, 1989, Ser. No. 313,619**

**Claims priority, application Fed. Rep. of Germany, Feb. 22, 1988, 3805507**

**Int. Cl.[5] G21C *3/34***

**U.S. Cl. 376—441** **5 Claims**



1. Nuclear reactor fuel assembly, comprising at least one uprightly disposed spacer having a grid of intersecting sheet-metal struts defining meshes therebetween, mutually parallel rods each being disposed in a respective one of said meshes, and strip-like contact springs being parallel to the rods and each having a side facing toward and a side facing away from a respective one of said struts, each of said contact springs being disposed in a respective one of said meshes and having two strip ends both being retained on said one strut, each of said contact springs having a contact location being resilient relative to said one strut for contacting a rod, said contact location being spaced apart from both of said strip ends, each of said contact springs having an undulatory transverse curve disposed at said contact location on said side of said contact spring facing toward said one strut, and said contact springs being continuously smooth and flat from said contact location to said strip ends resting on said one strut, wherein said undulatory transverse curve is in the form of a single curve disposed at said contact location, and said contact spring has transition locations adjacent said undulatory transverse curve being unequally spaced apart from said one strut on which said contact spring is retained.

2. Nuclear reactor fuel assembly, comprising at least one uprightly disposed spacer having a grid of intersecting sheet-metal struts defining meshes therebetween for receiving mutually parallel rods in a respective one of said meshes, and strip-like contact springs being parallel to the rods and each having a side facing toward and a side facing away from a respective one of said struts, each of said contact springs being disposed in a respective one of said meshes and having

a) two strip ends both resting on said one strut and being retained thereon,

b) two border regions, at least one of which to be contacted by a rod,

c) two smooth intermediate strip parts each extending from one of said strip ends to a respective one of said border regions,

d) a contact location having an two undulatory transverse curves, said contact location being resilient relative to said one strut and including said two border regions, said border regions being curved towards said one strut, and

e) said smooth intermediate strip parts being continuously flat before a rod is disposed in the respective mesh.

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**5,035,854**

## HIGH STRENGTH URANIUM-TUNGSTEN ALLOYS

**Paul S. Dunn, Santa Fe; Haskell Sheinberg; Billy M. Hogan, both of Los Alamos, all of N. Mex.; Homer D. Lewis, Bayfield, Colo., and James M. Dickinson, Los Alamos, N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Continuation of Ser. No. 329,901, Mar. 28, 1989, Pat. No. 4,959,194. This application Apr. 2, 1990, Ser. No. 502,958**

**Int. Cl.[5] C22C *43/00***

**U.S. Cl. 420—3** **2 Claims**

1. An alloy which is cast to form a coherent shape which is comprised of uranium having tungsten particles dispersed throughout the uranium, where the amount of tungsten present in said alloy is from about 4 wt% to about 35 wt%, where said alloy is made using tungsten powder as a starting material, and where substantially all of said tungsten particles have a size selected from the group consisting of (1) approximately the size of particles of said tungsten powder, (2) from about 3 to about 6 microns in diameter, and (3) from about 5 to about 20 nm in diameter.

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**5,035,855**

## MARTENSITIC PRECIPITATION-HARDENABLE STAINLESS STEEL

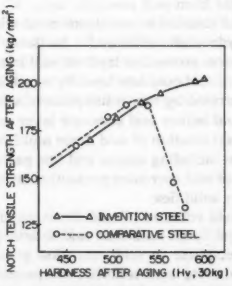
**Takeshi Utsunomiya; Kazuo Hoshino, and Sadao Hirotsu, all of Yamaguchi, Japan, assignors to Nisshin Steel Company, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 636,350, Jul. 31, 1984, abandoned. This application Jan. 4, 1990, Ser. No. 462,969**

**Claims priority, application Japan, Aug. 5, 1983, 58-143587**

**Int. Cl.[5] C22C *38/44***

**U.S. Cl. 420—61** **6 Claims**




1. A martensitic precipitation-hardenable stainless steel having excellent toughness consisting essentially of, in weight percent, not more than 0.06% C, greater than 1.0–3.5% si, not more than 1.0% Mn, greater than 6.0 up to 8.0% Ni, 12.0–15.0% Cr, 0.4–2.0% Mo, 0.2–0.8% Ti, not more than 0.5% Al and not more than 0.02% N, the remainder Fe and inevitable incidental impurities.

5,035,856

## MAGNETIC RECORDING MEDIUM

Noboru Koyama; Yasushi Nakano; Yoshitaka Yasufuku; Setsuko Kawahara; Takemasa Namiki; Shigetoshi Kawabe, and Masahiro Umemura, all of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Feb. 5, 1990, Ser. No. 475,131

Claims priority, application Japan, Feb. 8, 1989, 1-30484; Feb. 28, 1989, 1-49207; Mar. 29, 1989, 1-79308; Mar. 29, 1989, 1-79311

Int. Cl.[5] G11B *23/00*

U.S. Cl. 428—328 11 Claims

1. A magnetic recording medium comprising a nonmagnetic support and provided thereon a plurality of magnetic layers comprising ferromagnetic powder dispersed in a binder, wherein an uppermost magnetic layer of the magnetic layers contains an abrasive with an average particle diameter of not more than 0.3 μm, a magnetic layer other than the uppermost magnetic layer contains an abrasive with an average particle diameter of not less than 0.3 μm, an amount of abrasive particles having a particle diameter of not less than 1 μm is not more than 5% of the abrasive contained in the uppermost magnetic layer, and an amount of abrasive particles having a particle diameter of not less than 1 μm is not less than 5% of the abrasive contained in the layer other than the uppermost magnetic layer.

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5,035,857

## PROCESSES FOR PREPARING CHALCOGENIDE ALLOYS

Lawrence E. Kowalczyk, Penfield; Santokh S. Badesha, Pittsford; Paul F. Zukoski, Henrietta; Monroe J. Hordon, Pittsford; Steven M. Sterling, Walworth; Barry A. Lees, Fairport; Frederick A. Elder, Webster, and Roger W. LaForce, Fairport, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 306,379, Jan. 31, 1989, Pat. No. 5,002,734. This application Jul. 20, 1990, Ser. No. 555,215

Int. Cl.[5] G22F *1/00;* C01B *19/00*

U.S. Cl. 420—579 3 Claims

1. A process for the preparation of a photoreceptor with reduced fractionation which comprises providing a chalcogenide alloy component that has been subjected to crystallization, grinding and pelletizing, followed by evaporation, and depositing the resulting product on a supporting substrate.

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5,035,858

## METHOD FOR DISINFECTING MEDICAL MATERIALS

Jeffery S. Held, Chicago, and James W. Sharp, Arlington Heights, both of Ill., assignors to Stericycle, Inc., Rolling Meadows, Ill.

Continuation of Ser. No. 421,332, Oct. 13, 1989, abandoned. This application Jun. 1, 1990, Ser. No. 530,438

Int. Cl.[5] A61L *2/04, 2/08, 2/12*

U.S. Cl. 422—21 24 Claims

1. A method of disinfecting medical materials comprising:

(a) heating the medical materials to approximately 60° C.; and

(b) exposing the medical materials to a gamma radiation dose of approximately 0.25 to 2.0 Mrads.

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5,035,859

## CONTACT LENS DISINFECTING SYSTEM

Ben Gu, Evanston; Kenneth E. Bliznik, Lansing; Helmut K. Singer, Lincolnshire, and Sharon M. Ward, Forest Park, all of Ill., assignors to Schering Corporation, Kenilworth, N.J.

Filed Nov. 21, 1989, Ser. No. 439,769

Int. Cl.[5] A61L *2/18;* C07D *207/26*

U.S. Cl. 422—28 19 Claims

1. A method for disinfecting contact lenses which comprises contacting the lenses with an aqueous solution comprising an N-alkyl-2-pyrrolidone, where the alkyl group of the pyrrolidone is a $C_8$–$C_{20}$ alkyl moiety.

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5,035,860

## DETECTION STRIP FOR DETECTING AND IDENTIFYING CHEMICAL AIR CONTAMINANTS, AND PORTABLE DETECTION KIT COMPRISING SAID STRIPS

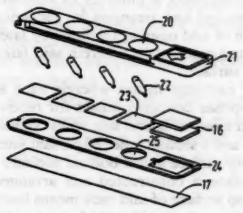
Adriaan Kleingeld; Kees R. Kooijmans, and Wilhelmus F. Kragtwijk, all of Delft, Netherlands, assignors to Duphar International Research B.V., Weesp, Netherlands

Filed Feb. 20, 1990, Ser. No. 481,322

Claims priority, application Netherlands, Feb. 24, 1989, 8900459

Int. Cl.[5] G01N *31/22, 21/78*

U.S. Cl. 422—61 5 Claims




1. A portable detection kit for detecting and identifying chemical air contaminants, comprising a number of detection strips and at least one device for breaking the reservoirs contained in the detection strips,

said device comprising one or more spaced switches, a base plate and an open space between the switches and the base plate which is proportioned so that a detection strip can be inserted into it, in which the switches can be switched, and are constructed so that in the presence of a detection strip provided in the device, upon switching a mechanical pressure is exerted on the reservoirs via a flexible strip, said pressure causing the reservoirs on the carriers supported by the base plate to be broken,

wherein the detection strips each comprise a holder having a plurality of spaced carriers, which are capable of absorbing the air contaminants and having a plurality of color-producing agents opposite the carriers, which agents, in contact with the absorbed air contaminants, can cause a color reaction in the presence of a liquid, said detection strip being characterized in that the color-producing agents, dissolved in the quantities of liquid required for the color reaction, are contained in closed reservoirs having walls which are easily broken by mechanical force, and the collective reservoirs are provided between the carriers and a flexible strip in such a manner that when a mechanical pressure is exerted on said flexible strip at the area of the reservoirs said flexible strip will yield, as a result of which the reservoirs, which are supported by a suitable support, will break and the contents thereof will be contacted with the absorbed air contaminants.

5,035,861

## LOCKING RACK AND DISPOSABLE SAMPLE CARTRIDGE

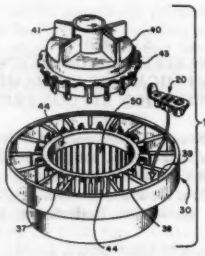
Cass J. Grandone, Lake Forest, Ill., assignor to Abbott Laboratories, Abbott Park, Ill.

Continuation of Ser. No. 399,365, Aug. 28, 1989, Pat. No. 4,956,148, which is a continuation of Ser. No. 41,189, Apr. 22, 1987, abandoned. This application Apr. 11, 1990, Ser. No. 508,327

The portion of the term of this patent subsequent to Sep. 11, 2007, has been disclaimed.

Int. Cl.[5] G01N *21/07*

U.S. Cl. 422—64 1 Claim



1. An apparatus for use in a biological sample analyzer comprising:

rack means comprising a plurality of bottomless openings each constructed and arranged for receiving a cartridge means, each of said openings defined by lateral side walls and inner and outer walls wherein said lateral side walls have a top surface;

a plurality of cartridge means wherein each said cartridge means comprises container means for receiving a sample therein, and a pair of lateral side walls connected by a first outer edge and a second inner edge, said lateral side walls having a top surface and a bottom surface, wherein said bottom surface is constructed and arranged for mating with said top surface of said rack means lateral side walls;

first alignment means on said cartridge means inner edge and said rack means inner end wall;

second alignment means on said cartridge means outer edge and on said rack means outer end wall; and

actuatable locking means mountable to said rack means, wherein said first alignment means and said second alignment means cooperate to align each said cartridge means in a predetermined position in a respective one of said openings and said locking means upon actuation contacts a portion of said first alignment means whereby said first alignment means and said second alignment means are held in positive engagement and each said cartridge means is locked against movement within said respective opening in a manner to substantially prohibit lateral, vertical and radial movement from said predetermined position.

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5,035,862

## ANALYTICAL SYSTEM FOR THE DETERMINATION OF A COMPONENT OF A FLUID

Werner Dietze, Tutzing; Rainer Füllemann, Weinheim, and Thomas Lutz, Mannheim, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

Filed Dec. 9, 1988, Ser. No. 282,107

Claims priority, application Fed. Rep. of Germany, Dec. 17, 1987, 3742786

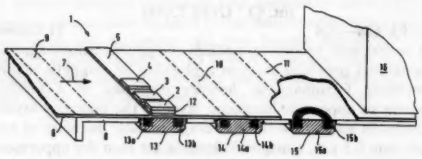
Int. Cl.[5] G01N *25/00*

U.S. Cl. 422—68.1 8 Claims

1. An analytical system for measuring the concentration of a component, said system comprising:

a test carrier having a test field and a metallic conducting layer associated with said test field, said metallic conducting layer lying parallel to the test field and being in thermal contact with the test field, the test field containing a reagent which reacts with said component to produce a measurable change in said test field, said change being accelerated by heat;

an induction heater having means for producing an alternating magnetic field, said magnetic field having a working



area in which a said metallic conducting layer is inductively heated when located therein;

means for guiding the test carrier so that the metallic conducting layer is in the working area of the alternating magnetic field; and

an evaluating instrument for measuring a change in the test field after the test field is heated, said change being characteristic of the concentration of the component.

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5,035,863

## SURFACE PLASMON RESONANCE SENSORS

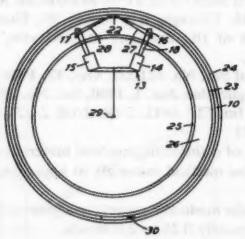
Martin F. Finlan, and Michael A. W. Brady, both of Buckinghamshire, England, assignors to Amersham International plc, Buckinghamshire, United Kingdom

Filed May 10, 1989, Ser. No. 350,033

Claims priority, application United Kingdom, May 10, 1988, 8811053; May 10, 1988, 8811054; Sep. 12, 1988, 8821336

Int. Cl.[5] G01N *21/00, 21/55, 33/559;* G01J *3/30*

U.S. Cl. 422—82.05 49 Claims



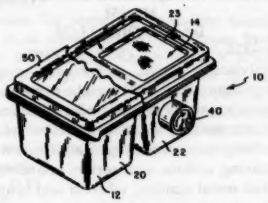
1. Sequencing apparatus comprising: means for analyzing a sample containing fragments which has been subjected to electrophoresis whereupon the fragments have been distributed in a pattern within the electrophoresis medium; and means, including a detector, for detecting the pattern of fragments distributed within the electrophoresis medium by inducing surface plasmon resonance at a boundary of said medium and by utilizing the phenomenon of such surface plasmon resonance to monitor the pattern of fragments by virtue of the change in refractive index which occurs in those parts of the electrophoresis medium in which fragments are present.

5,035,864

## BLOOD CONTAINMENT DEVICE

Craig J. Bell, Winchester, N.H., assignor to Smiths Industries Medical systems, Inc., Keene, N.H.

Continuation-in-part of Ser. No. 190,498, May 5, 1988, abandoned. This application Jan. 26, 1990, Ser. No. 470,944
Int. Cl.[5] B01I *11/00*
U.S. Cl. 422—99 25 Claims




1. A blood containment device comprising:
a housing having means defining an opening;
a roll of multi-ply material, including an absorbent ply and a microbial resistant ply, stored within said housing so that a portion of said absorbent ply is exposed through said opening;
a tension plate, non-integral with said housing, positioned to support said multi-ply material taut beneath the opening in said housing; and
a take-up reel arranged within said housing so that said multi-ply material is pulled past the opening in said housing as said material is rolled onto said reel.

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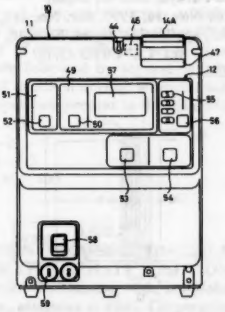
5,035,865

## VACUUM BLOOD SAMPLE COLLECTING DEVICE

Fumiaki Inaba, and Satoshi Inoue, both of Fujinomiya, Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan

Filed May 15, 1989, Ser. No. 352,097
Claims priority, application Japan, May 17, 1988, 63-118245; May 17, 1988, 63-118246; May 17, 1988, 63-118248
Int. Cl.[5] G05D *16/00*; A61M *1/00*
U.S. Cl. 422—99 17 Claims




1. A blood sample collecting device comprising:
a vacuum blood sampling chamber having a blood container disposed thereon;
a vacuum pump for evacuating the vacuum blood sampling chamber to collect a blood sample into the blood container under a vacuum developed in said vacuum blood sampling chamber;
measuring means for measuring the amount of collected blood in said blood container;
means coupled to said measuring means for determining a rate of increase in the measured amount of collected blood; and
control means for lowering the vacuum in said vacuum blood sampling chamber below a preset pressure when said determined rate of increase in the measured amount of collected blood is less than a predetermined normal rate of increase.

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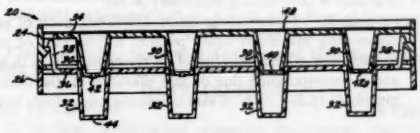
5,035,866

## LUMINESCENCE REACTION TEST APPARATUS

Jon C. Wannlund, 2315 Via Santos, Unit C, Carlsbad, Calif. 92008

Filed Feb. 16, 1988, Ser. No. 155,955
Int. Cl.[5] B01L *3/00*
U.S. Cl. 422—102 11 Claims




1. An article of manufacture for testing a specimen therein, comprising:
a plurality of test wells, each of said test wells including
a lower reaction cup having a final reactant therein, the lower reaction cup further having a flat, solid bottom with no opening therethrough, and
an upper reaction cup positioned above said lower reaction cup and having a penultimate reactant therein, said upper reaction cup further having means for defining an orifice in the bottom thereof disposed such that liquid flowing through said orifice is discharged into said lower reaction cup; and
a support for said test wells and said reaction cups thereof, said support including
an upper plate supporting said upper reaction cups, and
a lower plate supporting said lower reaction cups, said upper and lower plates being keyed to register said upper and lower reaction cups for each of said test wells.

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5,035,867

## REACTOR AND REACTION METHOD WITH INTERNAL HEAT CONTROL BY HOLLOW HEAT EXCHANGER PLATES

Quang Dang Vu, Neuilly; Roland Huin, Montesson Labore, and Jean-Paul Euzen, Dardilly, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

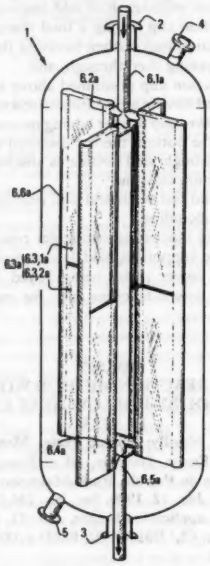
Filed Jan. 12, 1989, Ser. No. 296,179
Claims priority, application France, Jan. 13, 1988, 88 00340
Int. Cl.[5] B01J *8/02*; F28D *9/00*
U.S. Cl. 422—200 26 Claims

1. An apparatus comprising a substantially cylindrical reactor (1) having a substantially circular cross section, said reactor also having an upper part, a lower part, and a central axis, and said reactor being in fluid communication with a first duct (2) for introduction of heat-carrying fluid, at least one duct (4) for introduction of a charge into said reactor, a second duct (3) for removal of heat-carrying fluid, and at least one duct (5) for removal of reaction effluent from said reactor, said apparatus further comprising:
(a) a central distributing manifold (6.1*a*), having a longitudinal axis corresponding to said axis of said reactor, which is situated in the upper part of said reactor and is in fluid communication with said first duct (2) for introduction of heat-carrying fluid;
(b) a plurality of distributing manifolds (6.2*a*), each having a longitudinal axis parallel to said axis of said reactor, said distributing manifolds being individually in fluid communication, towards their top, with said central distributing manifold (6.1*a*);
(c) a central receiving manifold (6.5*a*) having a longitudinal

axis corresponding to said axis of said reactor, which is situated in said lower part of said reactor and is in fluid communication with said second duct (3) for removal of heat-carrying fluid;

(d) a plurality of receiving manifolds (6.4*a*), each having a longitudinal axis parallel to said axis of said reactor, said receiving manifolds being individually in fluid communication, towards their base, with said central receiving manifold (6.5*a*) and each of said receiving manifolds being positioned substantially along the same axis of a corresponding one of said plurality of distributing manifolds (6.2*a*), a sealed contact surface existing between each receiving manifold (6.4*a*) and its corresponding one of said plurality of distributing manifolds (6.2*a*);

(e) a plurality of connecting manifolds (6.6*a*), each of said connecting manifolds being parallel to the axes of said reactor, one of said plurality of receiving manifolds (6.4*a*), and a corresponding one of said plurality of distributing manifolds (6.2*a*), each of said connecting manifolds being




situated in a plane defined by said axes of said reactor, said one of said plurality of receiving manifolds (6.4*a*), and said corresponding one of said plurality of distributing manifolds (6.2*a*);

(f) a plurality of continuous, elongated, substantially parallel-epipedic, hollow plates (6.3*a*) suitable for flow of heat-carrying fluid, each of said plates being divided, widthways, into a pair of half-panels (6.3, 1*a*; 6.3, 2*a*), a sealed contact surface existing between said half-panels of said pair, each of said half-panels of said pair being in fluid communication with one of said plurality of connecting manifolds (6.6*a*) thereby placing each of said half-panels of each of said hollow plates in fluid communication with the other half-panel of said pair, one of said half-panels of said pair (6.3, 1*a*) being in fluid communication with one of said plurality of distributing manifolds (6.2*a*) and other half-panel of said pair (6.3, 2*a*) being in fluid communication with said corresponding one of said plurality of receiving manifolds (6.4*a*).

**5,035,868**

## CATALYST COMPOSITION CONTAINING A CRYSTALLINE GALLIOSILICATE HAVING THE ZEOLITE L TYPE STRUCTURE

**Mario L. Occelli, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.**

**Division of Ser. No. 274,621, Nov. 22, 1988, Pat. No. 4,919,907, which is a continuation-in-part of Ser. No. 945,092, Dec. 22, 1986, abandoned. This application Dec. 28, 1989, Ser. No. 458,351**

**Int. Cl.[5] C01B *33/28***

**U.S. Cl. 423—326** **21 Claims**

**10**. A catalytically active, galliosilicate molecular sieve containing less than about 0.20 weight percent alumina prepared by ion-exchanging a synthesized galliosilicate molecular sieve whose composition is set forth below with cations selected from the group consisting of ammonium cations, lanthanum-containing cations and cerium-containing cations to reduce its alkali metal content, wherein said synthesized galliosilicate molecular sieve contains less than about 0.20 weight percent alumina and has the following composition expressed in terms of oxide mole ratios in the anhydrous state:

$$Ga_2O_3:SiO_2:yM_2O:zK_2O$$

where M is an alkali metal other than potassium, x equals at least 3.0, y equals 0 to 0.9, z equals 0.1 to 1.0 and y+z equals about 1.0, said synthesized galliosilicate molecular sieve having an X-ray powder diffraction pattern comprising the d-spacings set forth in Table 1.

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**5,035,869**

## PROCESS FOR REDUCING URANYL SALT

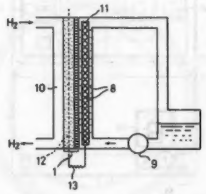
**Nagakazu Furuya, No. 4-3-31, Ohte 2-chome, Kofu-shi, Yamanashi, Japan, assignor to Tanaka Kikinzoku Kogyo K.K. and Nagakazu Furuya, both of, Japan**

**Filed Nov. 16, 1990, Ser. No. 614,272**

**Claims priority, application Japan, Nov. 16, 1989, 1-298698**

**Int. Cl.[5] C01G *43/00***

**U.S. Cl. 423—253** **3 Claims**




**1**. A process for obtaining an uranous salt solution by reducing an uranyl salt solution which comprises reducing an uranyl salt to an uranous salt by supplying an uranyl salt solution to a reaction layer side of a gas diffusion membrane comprising the reaction layer which comprises a hydrophilic portion supported with a platinum group catalyst and a hydrophobic portion and a gas supply layer containing hydrophobic pores, and supplying a hydrogen gas from the gas supply layer side.

**2**. The process claimed in claim **1**, wherein a metal mesh coated with a catalyst is inserted in the gas supply layer of the gas diffusion membrane and another metal mesh is added to the reaction layer side, the two metal meshes being connected by a leading wire.

5,035,870

## CRYSTALLINE ALUMINOPHOSPHATE COMPOSITIONS

David M. Clark, and Ronald J. Dogterom, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed May 15, 1990, Ser. No. 523,513

Claims priority, application United Kingdom, Sep. 15, 1989, 8920906

Int. Cl.[5] C01B *35/12, 25/36;* B01J *27/18*

U.S. Cl. 423—277 24 Claims

11. A process for preparing crystalline aluminophosphates comprising in an as-synthesized anhydrous form a chemical composition: $m'R(X_nAl_qP_x)O_2$, wherein R is derived from a 2,2'-bipyridyl moiety, X represents one or more elements which can be substituted for Al and/or P, and is selected from the group consisting of beryllium, magnesium, titanium, manganese, iron, cobalt, zinc, vanadium, nickel, chromium, silicon, lithium, boron, gallium, germanium, arsenic and mixtures thereof, wherein

$m'=0.01-0.33$

$n=0-0.40$

$q=0.30-0.60$

$x=0.30-0.60$

and wherein $n+q+x=1$,

and having an X-ray diffraction pattern containing at least the following lines:

| d(A) | Intensity |
|---|---|
| 8.3–8.7 | m |
| 7.2–7.4 | w |
| 7.0–7.2 | m/s |
| 5.1–5.3 | w |
| 5.0–5.2 | vw/w |
| 4.16–4.26 | w/m |
| 4.13–4.23 | m/s |
| 4.08–4.18 | w/m |
| 3.97–4.07 | w/m |
| 3.92–4.02 | m |
| 3.60–3.70 | vs |
| 3.24–3.30 | m |
| 2.90–2.96 | w |
| 2.73–2.79 | vw/w |

from a forming solution or gel which comprises mixing a source of aluminum, a source of phosphorous, and a template source based on a 2,2'-bipyridyl moiety, which mixture is kept at a temperature in the range of from about 80° C. to about 220° C. for a period of time sufficient to produce a crystalline aluminophosphate followed by separating off the crystalline product obtained and then drying, wherein said solution or gel has various components present in the following molar ratios:

$R:Al_2O_3=0.1-3$

$X:Al_2O_3=0-2$

$P:Al_2O_3=0.3-1.3$

$H_2O:Al_2O_3=40-500$.

5,035,871

## PRODUCTION OF CONCENTRATED AQUEOUS POLYPHOSPHATE SOLUTIONS

Charles F. Sikorski, W. Trenton, N.J., and John W. DeMarco, Langhorne, Pa., assignors to FMC Corporation, Philadelphia, Pa.

Filed Jun. 18, 1990, Ser. No. 539,244

Int. Cl.[5] C01B *25/41*

U.S. Cl. 423—305 16 Claims

1. In the process of preparing a concentrated aqueous polyphosphate solution by the neutralization reaction of polyphosphoric acid with an alkali metal base in aqueous media, the improvement of enriching the lower polyphosphate content of the polyphosphate solution by effecting a shift in the ratio of lower to higher polyphosphate moieties found in the acid to the lower members during the neutralization, comprising the addition of polyphosphoric acid having a $P_2)_5$ assay of from about 82.0% to about 85.0% to the entire contents of a stirred concentrated, aqueous base solution of sodium or potassium hydroxide at a temperature of from about 30° C. to about 60° C. over a time interval of about two to eight hours, the amount of aqueous alkali being slightly in excess of that for neutralizing the polyphosphoric acid and recovering a concentrated aqueous solution of enriched sodium and potassium lower polyphosphates.

9. The product obtained by the process of claim 1.

5,035,872

## METHOD OF PREPARING POTASSIUM MAGNESIUM PHOSPHATE

Karl-Richard Löblich, Barsinghausen, and Susanne Lange, Woltershausen, both of Fed. Rep. of Germany, assignors to Kali und Salz Aktiengesellschaft, Kassel, Fed. Rep. of Germany

Filed May 3, 1990, Ser. No. 518,113

Claims priority, application Fed. Rep. of Germany, May 5, 1989, 3914796

Int. Cl.[5] C01B *25/45*

U.S. Cl. 423—306 10 Claims

1. Method of preparing potassium magnesium phosphate hexahydrate by reacting calcium dihydrogen phosphate with potassium sulfate and a basic magnesium compound in a first stage and a second stage, comprising the following steps:

providing said first stage with an inlet and an outlet;

providing said second stage with an inlet and an outlet;

introducing potassium sulfate into the second stage before or simultaneously with the addition into the second stage of magnesium oxide and/or hydroxide to produce potassium magnesium phosphate and a mother liquor containing potassium sulfate;

said potassium magnesium phosphate being crystallized and separated from the mother liquor;

recycling the mother liquor to the inlet of the first stage, where the mother liquor containing potassium sulfate is introduced into the first stage based upon the rate of reaction;

introducing calcium dihydrogen phosphate into the inlet of the first stage;

in said first stage reacting said potassium sulfate with said calcium dihydrogen phosphate to produce gypsum and potassium dihydrogen phosphate in a reacted-out slurry;

introducing a suspension of the finely divided calcium dihydrogen phosphate in a reacted-out slurry that is obtained from the outlet of the first stage, and is recirculated back into the inlet of the first stage, and contains a seed in the form of the already formed gypsum, and is added to gypsum wash filtrate;

in said first stage, dividing said practically reacted-out first stage slurry into two portions;

recirculating one portion of said reacted-out first stage slurry to the inlet of the first stage from the outlet of the first stage to suspend the calcium dihydrogen phosphate;

separating said gypsum from the other portion of said first stage slurry of the first stage;

after the gypsum has been separated, leaving the potassium dihydrogen phosphate solution in said first stage slurry and transporting said solution to the inlet of the second stage from the outlet of the first stage;

introducing into the inlet of the second stage the potassium dihydrogen phosphate solution from the outlet of the first stage along with, or immediately after, the addition of the magnesium oxide and/or hydroxide and potassium sulfate into the inlet of the second stage;

recycling back to the inlet of the second stage a second stage slurry obtained from the outlet of the second stage, and said second stage slurry containing a seed in the form of the already formed potassium magnesium phosphate as it is being recirculated back into said second stage;

introducing ammonia as a crystallization promoter into the second stage;

dividing the second stage slurry leaving the outlet of the second stage into two portions;

returning one portion of said second stage slurry from the outlet of the second stage to the inlet of the second stage;

dividing the other portion of said second stage slurry by filtering out the potassium magnesium phosphate hexahydrate product that is not washed with water before being dried; and

producing the mother liquor from the other portion of the second stage slurry that is recirculated from the outlet of the second stage to the inlet of the first stage.

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**5,035,873**

## SYNTHETIC ALKALI METAL ALUMINO-SILICATES COMPOSITIONS AND THEIR METHODS OF PREPARATION

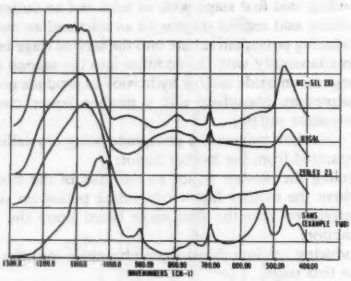
**Satish K. Wason, Macon, Ga., assignor to J. M. Huber Corporation, Rumson, N.J.**

**Continuation of Ser. No. 875,120, Jun. 17, 1986, abandoned. This application Jan. 17, 1989, Ser. No. 297,738**

**The portion of the term of this patent subsequent to Mar. 14, 2006, has been disclaimed.**

**Int. Cl.[5] C01B *33/26***

**U.S. Cl. 423—328** **6 Claims**



1. An alkali metal alumino-silicate having a composition in terms of mole ratio of oxides as follows:

$$xM_2O:Al_2O_3:ySiO_2:zH_2O$$

where x is the number of moles of alkali metal oxide, M is an alkali metal, y is the number of moles of $SiO_2$ associated with the alkali metal alumino-silicate compositions, and z is the number of moles of bound water, and having the morphology of rimmed particles as depicted in any one of TEM FIGS. 18–23.

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**5,035,874**

## DIALLYL TELLURIDE AND SYNTHESIS OF DIORGANO TELLURIDES

**Kelvin T. Higa, and Daniel C. Harris, both of Ridgecrest, Calif., assignors to The United Staes of America as represented by the Secretary of the Navy, Washington, D.C.**

**Division of Ser. No. 66,442, Jun. 26, 1987, abandoned. This application Feb. 14, 1990, Ser. No. 493,521**

**Int. Cl.[5] C01B *19/04***

**U.S. Cl. 423—509** **1 Claim**

1. A process for preparing pure alkali metal tellurium compounds under an inert atmosphere, comprising the steps of:

(a) adding tellurium and an alkali metal selected from the group consisting of lithium, sodium, and potassium to a solution of tetrahydrofuran and naphthalene wherein the ratio of tetrahydrofuran to naphthalene is from about 20 mL to about 500 mL tetrahydrofuran to 0.1 gram of naphthalene to form a mixture;

(b) refluxing said mixture for at least 8 hours; and

(c) separating a final solid product from a liquid fraction.

**5,035,875**

## RECOMBINATION CATALYST

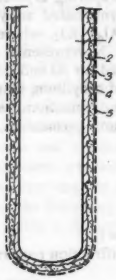
**Stephen R. Daish, Sunbury on Thames, United Kingdom, assignor to British Nuclear Fuels Plc, Warrington, England**

**Filed Jan. 12, 1990, Ser. No. 464,015**

**Claims priority, application United Kingdom, Jan. 27, 1989, 8901738**

**Int. Cl.[5] C01B *5/00***

**U.S. Cl. 423—580** **14 Claims**




1. A container for radioactive material including therein a catalytic device for catalysing the recombination of gaseous hydrogen and oxygen in the container to give water, the device comprising a substrate in the form of at least one metal member and carrying a thermally sprayed low surface area ceramic coating which carries a high surface area ceramic coating, which latter coating carries catalytically active material for the recombination, the device having an outer, hydrophobic gas permeable coating resistant to nuclear radiation for preventing water from contacting the catalytically active material, the device being located in the container so that the hydrogen and oxygen are brought into contact with the device by passive gas transfer and oriented such as to enable water to drain therefrom.

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**5,035,876**

## PROCESS FOR PREPARING A PRECURSOR OF ZIRCONIUM DIOXIDE

**Maurizio Castellano, Turin, Italy, assignor to Enitricerche S.p.A., Milan, Italy**

**Filed Oct. 13, 1989, Ser. No. 421,133**

**Claims priority, application Italy, Oct. 19, 1988, 22357 A/88**

**Int. Cl.[5] B01J *13/00*; C01G *25/02***

**U.S. Cl. 423—608** **12 Claims**

1. A process for preparing a precursor of zirconium dioxide in submicronic particle form by hydrolyzing zirconium alkoxide with water, comprising:

(a) contacting zirconium alkoxide with a microemulsion in a hydrolysis reaction to thereby hydrolyze said zirconium alkoxide, said microemulsion comprising an external oil phase; an internal aqueous phase wherein the size of particles of the aqueous phase are from 50 to 200 angstroms; an emulsifier; and a co-emulsifier;

(b) discontinuing the hydrolysis reaction in order to control the particle growth; and

(c) recovering the precursor of zirconium dioxide.

5,035,877

## NON-IONIC CONTRAST MEDIA FROM IONIC CONTRAST MEDIA

Milos Sovak, Rancho Santa Fe, and Ramachandran Ranganathan, San Diego, both of Calif., assignors to Cook Imaging Corporation, Bloomington, Ind.

Continuation of Ser. No. 402,965, Sep. 5, 1989, abandoned, which is a continuation of Ser. No. 110,092, Oct. 13, 1987, abandoned, which is a continuation of Ser. No. 764,274, Aug. 9, 1985, abandoned. This application Sep. 14, 1990, Ser. No. 582,791

Int. Cl.[5] C07C 237/46; A61K 31/165, 49/04

U.S. Cl. 424—5 1 Claim

1. In a method of X-raying a host employing a contrast medium, the improvement which comprises employing as a contrast medium 5-(N-2,3-dihydroxypropylacetamido)-2,4,6-triiodo-N-(2,3-dihydroxypropyl)-N'-(2-hydroxyethyl)-iso phthalamide.

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5,035,878

## USE OF DITHIOCARBAMATES TO COUNTERACT MYELOSUPPRESSION

Richard F. Borch, Pittsford, N.Y., and Therese K. Schmalbach, Newton, Mass., assignors to University of Rochester, Rochester, N.Y.

Continuation-in-part of Ser. No. 243,405, Sep. 12, 1988, Pat. No. 4,938,949. This application Oct. 10, 1989, Ser. No. 418,549

The portion of the term of this patent subsequent to Jul. 3, 2007, has been disclaimed.

Int. Cl.[5] A61K 49/00, 31/535, 31/495, 31/505

U.S. Cl. 424—10 7 Claims

1. A process for the treatment of myelosuppression resulting from a toxic side effect of a cytotoxic, platinum-free DNA synthesis-inhibiting or alkylating 2-chloroethyl-containing drug which has been administered to a live mammal, said process comprising:

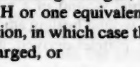
administering to said live mammal an $ED_{50}$, which is 0.03 to 145 mg per square meter of surface area of the body of the mammal and is not more than 10 mg/kg of the body weight of the mammal, of a compound of the formula

wherein

$R^1$ and $R^2$ are the same or different lower aliphatic or cycloaliphatic or heterocycloaliphatic groups, unsubstituted or substituted by hydroxyl, or one of $R^1$ and $R^2$, but not both, can be H, or $R^1$ and $R^2$, taken together with the N atom, can be a 5- or 6-member N-heterocyclic ring which is aliphatic or aliphatic interrupted by a ring oxygen or a second ring nitrogen, and

M is H or one equivalent of a pharmaceutically acceptable cation, in which case the rest of the molecule is negatively charged, or

M is



wherein $R^3$ and $R^4$ are defined in the same manner as $R^1$ and $R^2$.

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5,035,879

## SILICAS

Derek Aldcroft, South Wirral; John R. Newton, and Peter W. Stanier, both of Cheshire, all of England, assignors to Unilever Patent Holdings BV, Rotterdam, Netherlands

Division of Ser. No. 244,898, Sep. 15, 1988, Pat. No. 4,992,251. This application Oct. 29, 1990, Ser. No. 604,235

Claims priority, application United Kingdom, Sep. 15, 1987, 8721644

Int. Cl.[5] A61K 7/16

U.S. Cl. 424—49 9 Claims

1. A toothpaste composition containing from about 5% to about 50% by weight of an amorphous silica having

(i) a BET surface area in the range from about 420 to about 550 $m^2/g$,

(ii) a weight mean particle size in the range from about 5 to about 20 microns,

(iii) a perspex abrasion value in the range from about 15 to about 28,

(iv) a mean pore diameter in the range from about 3.0 to about 8.0 nm,

(v) a transmission of at least about 70% in the refractive index range of 1.444 to 1.460, and

(vi) an oil absorption in the range from about 70 to about 140 cc/100 g.

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5,035,880

## DENTIFRICE COMPOSITION

Shigeki Mori, Takatsuki, and Naomi Yokosuka, Daito, both of Japan, assignors to Sunstar Kabushiki Kaisha, Osaka, Japan

Filed Aug. 6, 1990, Ser. No. 563,185

Claims priority, application Japan, Sep. 25, 1989, 1-248664

Int. Cl.[5] A61K 7/22

U.S. Cl. 424—54 4 Claims

1. A dentifrice composition in the form of an aqueous gel comprising 15 to 80% by weight of a polyoxyethylene-polyoxypropylene block copolymer surfactant based on the total weight of the composition, 0.001 to 5% by weight of cetylpyridinium chloride based on the total weight of the composition, and polyethylene glycol having an average molecular weight of 2,000 to 20,000 in a proportion of 1/200 to ½ based on the weight of the polyoxyethylene-polyoxypropylene block copolymer.

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5,035,881

## DENTIFRICE COMPOSITION

Shigeki Mori, and Chiho Makino, both of Takatsuki, Japan, assignors to Sunstar Kabushiki Kaisha, Osaka, Japan

Filed Apr. 16, 1990, Ser. No. 509,344

Claims priority, application Japan, Apr. 24, 1989, 1-104151

Int. Cl.[5] A61K 7/22, 7/16

U.S. Cl. 424—54 4 Claims

1. A dentifrice composition which is a foaming bactericidal toothpaste, free of any binder and comprises (A) 0.001 to 0.5% by weight of biguanido bactericide or N-alkyldiaminoethylglycine bactericide, (B) not less than about 11% by weight to n to more than 80% by weight of polyoxyethylene-polyoxypropylene block copolymer surfactant, and (C) 0.01 to 5% by weight of a foaming N-higher acylamino acid or salt thereof.

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5,035,882

## COMBINATION OF FORMATE ESTERS AND PEPPER-LIKE CONSTITUENTS AS AN ORALLY-CONSUMABLE CHLOROFORM SUBSTITUTE

Mamoun M. Hussein, Mountain Lakes; Shirley A. Barcelon, Randolph, and Donald M. Lynch, Flemington, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Apr. 12, 1990, Ser. No. 508,758

Int. Cl.[5] A61K 7/16, 7/26, 9/68, 35/78

U.S. Cl. 424—58 24 Claims

1. A liquid flavoring composition consisting essentially of in an acceptable solvent to about 1.0% by weight of one or more pungent and biting tasting pepper-like constituent(s) and from about 5.0% to about 99.5% by weight of one or more volatile formate ester(s); said composition being substantially free of chloroform and suitable as an orally-consumable chloroform substitute, and having essentially all of the sweet, cooling, tingly, slightly burning and biting taste and mouthfeel characteristics of chloroform.

5,035,883

## COMPOSITION AND METHOD FOR TREATING HUMAN DISORDERS SUSCEPTIBLE TO ANTIMICROBIAL TREATMENT

Roy T. Witkin, Westport, Conn., assignor to Albert L. Jacobs, New York, N.Y., a part interest

Continuation of Ser. No. 239,799, Sep. 2, 1988. This application Dec. 15, 1989, Ser. No. 452,280

Int. Cl.[5] A61K *33/40, 31/79, 33/18;* A61L *9/00*

U.S. Cl. 424—78 2 Claims

1. A method of treating vaginal infection, athlete's foot infection, herpes simplex I and papilloma virus infection and method of human first aid debriding and disinfecting injuries due to microbial infections which comprises applying to affected human area a composition comprising an aqueous solution of povidone-iodine complex containing nascent oxygen from a suitable supply source thereof, and povidone iodine complex solution being maintained out of physical contact with the nascent oxygen source and combined shortly prior to application of the composition to the microbially affected human area thereby providing maximal antimicrobial activity while shortening the treatment time and increasing its effectiveness.

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5,035,884

## METHYLENE PYRROLIDONE COPOLYMERS FOR CONTACT LENS AND PHARMACEUTICAL PREPARATIONS

Suk-Zu Song, Flanders; Surendra C. Mehta, Randolph; Kuchi S. Murthy, Morris Plains; Russell U. Nesbitt, Somerville, and Mahdi B. Fawzi, Flanders, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 347,630, May 5, 1989, Pat. No. 4,931,519, which is a division of Ser. No. 57,467, Jun. 2, 1987, Pat. No. 4,851,545. This application Feb. 15, 1990, Ser. No. 480,431

Int. Cl.[5] A61K *31/785;* G02C *7/04*

U.S. Cl. 424—78 5 Claims

1. A method of using a copolymer of N-isopropyl-3-methylene-2-pyrrolidone and 2-hydroxyethylmethacrylate having an equilibrium water concentration of 36.5% by weight at room temperature in a transdermal delivery system for administration of a pharmaceutical.

3. A method of using a copolymer of N-isopropyl-3-methylene-2-pyrrolidone and 2-hydroxyethylmethacrylate having an equilibrium water concentration of 36.5% by weight at room temperature in a soft contact lens.

4. A method of using a copolymer of N-isopropyl-3-methylene-2-pyrrolidone and 2-hydroxyethylmethacrylate having an equilibrium water concentration of 36.5% by weight at room temperature as a wound dressing.

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5,035,885

## NONCOMPACTED MAKE-UP POWDER OR POWDER FOR THE CARE OF THE BODY AND FACE CONTAINING SYNTHETIC THERMOPLASTIC MATERIAL IN THE FORM OF HOLLOW MICROSPHERES

Jean-Pierre Arraudeau, Paris, and Anne Boelle, Meudon, both of France, assignors to L'Oreal, Paris, France

Continuation-in-part of Ser. No. 66,165, Jun. 25, 1987, abandoned. This application Mar. 28, 1989, Ser. No. 329,880

Claims priority, application France, Jun. 26, 1986, 86 09289

Int. Cl.[5] A61K *7/35, 31/74*

U.S. Cl. 424—78 9 Claims

1. A noncompacted powder composition for make-up or care of the body and face having superior oil absorbing effect consisting essentially of hollow microspheres of a vinylidene chloride-acrylonitrile polymer containing by weight 20 to 60 percent of units derived from vinylidene chloride, 20 to 60 percent of units derived from acrylonitrile and 0–40 percent by weight of units derived from an acrylic or styrene monomer and having a specific mass less than 0.1 g/cm$^3$, said microspheres being present in an amount ranging from 0.2 to 20 weight percent based on the total weight of said composition, and an oil present in an amount ranging from 1.5 to 70 weight percent based on the total weight of said composition characterized by base of spreading, fineness, softness and comfort.

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5,035,886

## ACTIVE AGENT DELIVERY DEVICE

Paritosh M. Chakrabarti, Pittsburgh, Pa.; Harlan B. Johnson, Rittman; Malcolm Korach, Akron, both of Ohio; Dennis D. Leatherman, Pittsburgh, Pa.; and Robert R. Simmons, Norton, Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa. to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 264,242, Oct. 28, 1988, Pat. No. 4,959,208, which is a continuation-in-part of Ser. No. 250,015, Sep. 27, 1988, Pat. No. 4,957,787, which is a continuation-in-part of Ser. No. 110,147, Oct. 19, 1987, abandoned. This application May 10, 1990, Ser. No. 521,626

The portion of the term of this patent subsequent to May 23, 2006, has been disclaimed.

Int. Cl.[5] A61K *31/74*

U.S. Cl. 424—78 5 Claims

1. An active agent delivery device which releases active agent over a prolonged period of time comprising:

(a) microporous material comprising:

(1) a matrix consisting essentially of essentially linear ultrahigh molecular weight polyethylene having an intrinsic viscosity of at least about 18 deciliters/gram,

(2) finely divided particulate substantially water-insoluble filler, of which at least about 50 percent by weight is siliceous, distributed throughout said matrix, said filler constituting from about 50 percent to about 90 percent by weight of said microporous material, and

(3) a network of interconnecting pores communicating throughout said microporous material, said pores constituting more than 35 percent by volume of said microporous material.

(b) a releasable fragrance, flavor, or precursor thereof associated with at least a portion of said filler.

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5,035,887

## WOUND HEALING COMPOSITION OF IL-1 AND PDGF OR IGF-1

Harry N. Antoniades, Newton, and Samuel E. Lynch, Jamaica Plain, both of Mass., assignors to Institute of Moelcular Biology, Inc., Boston and President and Fellows of Harvard College, Cambridge, both of, Mass.

Filed Sep. 7, 1989, Ser. No. 403,969

Int. Cl.[5] A61K *37/36*

U.S. Cl. 424—85.2 10 Claims

1. A method for healing an external wound of a mammal comprising applying to said wound a wound healing amount of a composition comprising purified platelet-derived growth factor and purified interleukin-1.

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5,035,888

## THERAPEUTICALLY USEFUL MINERAL COMPOSITION

Tadataka Hara, 4-31-15 Hamadayama, Suginami-ku, Tokyo 168, Japan

Continuation of Ser. No. 270,421, Nov. 9, 1988, abandoned, which is a continuation of Ser. No. 183,280, Apr. 17, 1988, abandoned, which is a continuation of Ser. No. 83,000, Aug. 5, 1987, abandoned, which is a continuation of Ser. No. 914,560, Oct. 2, 1986, abandoned, which is a continuation of Ser. No. 745,928, Jun. 20, 1985, abandoned, which is a continuation of Ser. No. 679,601, Dec. 7, 1984, abandoned. This application Nov. 6, 1989, Ser. No. 433,385

Int. Cl.[5] A61K *35/78, 33/00*

U.S. Cl. 424—195.1 10 Claims

1. A pharmaceutical composition of essential minerals com-

prising wood ash particles of about 100 to 200 mesh size derived from whole hardwood trees in combination with calcium carbonate in a weight ratio of about 8:1 to about 9:1 respectively.

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**5,035,889**

## CONTINUOUSLY WORKING PRESS

**Friedrich B. Bielfeldt, Eppingen, Fed. Rep. of Germany, assignor to Maschinenfabrik J. Dieffenbacher GmbH & Co., Eppingen, Fed. Rep. of Germany**

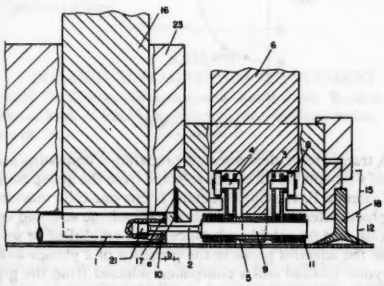
**Continuation of Ser. No. 288,130, Dec. 22, 1988, abandoned. This application Apr. 5, 1990, Ser. No. 504,700**

**Claims priority, application Fed. Rep. of Germany, Dec. 22, 1987, 3743664**

**The portion of the term of this patent subsequent to May 1, 2007, has been disclaimed.**

**Int. Cl.[5] B30B *3/00***

**U.S. Cl. 425—371** **10 Claims**



1. A continuously working press comprising:

a table member;

a press member disposed thereover defining a horizontal pressing plane therebetween;

first and second flexible bands disposed about said table member and press member, respectively;

rotating means which rotates said bands about said table member and press member;

a plurality of roller rod conveyor assemblies disposed between said table and press members and said flexible bands;

each of said roller rod conveyor assemblies comprising:

(a) a plurality of roller rods extending perpendicular to the direction of rotation of said flexible bands,

(b) a lead-in wheel which drives said roller rods onto said horizontal pressing plane,

(c) a guide chain means connected to said roller rods and extending beyond the pressing plane,

(d) an entering wheel coaxial with said lead-in wheel and which drives said guide chain onto said horizontal pressing plane with the same arc and scant dimensions as the path of said roller rods, and

(e) a plurality of supporting wheels which support said guide chain means beyond the pressing plane.

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**5,035,890**

## EMULSIFIER-FREE HAND AND BODY LOTION

**Michael C. Braun, Port Jervis, N.Y., assignor to Dow Corning Corporation, Midland, Mich.**

**Filed Apr. 10, 1989, Ser. No. 335,412**

**Int. Cl.[5] A61K *9/10***

**U.S. Cl. 424—401** **7 Claims**

1. An emulsifier-free hand and body lotion in the form of a clear gel dispersion comprising a gelled water system, the gelled water system including water, and a gel-forming agent, a particulate carrier material of a highly cross-linked hydrophobic polymer powder, and at least one active ingredient being dispersed uniformly throughout and entrapped within said powder carrier, the active ingredient being selected from the group consisting of skin compatible oils, skin compatible humectants, emollients, moisturizing agents, and sunscreens.

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**5,035,891**

## CONTROLLED RELEASE SUBCUTANEOUS IMPLANT

**Richard A. Runkel, Palo Alto, and Jung-Chung Lee, San Jose, both of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.**

**Continuation of Ser. No. 105,149, Oct. 5, 1987, abandoned. This application Aug. 24, 1989, Ser. No. 398,106**

**Int. Cl.[5] A61F *13/00***

**U.S. Cl. 424—423** **29 Claims**

1. A reservoir device for the sustained administration of a steroid hormone useful for promoting weight gain in livestock, suitable for subcutaneous implantation, which device comprises:

a) a pellet or plurality of pellets, wherein each pellet comprises

1) a steroid hormone in a livestock weight gain-promoting amount,

2) a solid hydrophilic polymer in an amount sufficient to cause swelling of said device by osmotic pressure, and

3) a solubilizing agent in an amount sufficient to maintain an effective concentration of said steroid hormone in solution within said device, wherein said solubilizing agent is an ionic surfactant having an aliphatic chain of 8 to 22 carbon atoms; and

b) a sufficient amount of a non-porous, rate-controlling membrane which completely encapsulates said pellet or said plurality of pellets, wherein:

1) said membrane is prepared from a material that is selected from the group consisting of an aliphatic polyurethane, an aromatic polyurethane, a silicone rubber, a polyethylene-vinyl acetate copolymer, and a polystyrene-butadiene copolymer; and

2) said membrane is permeable to water and to said steroid hormone, but is impermeable to said solubilizing agent and said hydrophilic polymer.

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**5,035,892**

## ANTIMICROBIAL SUPERABSORBENT COMPOSITIONS AND METHODS

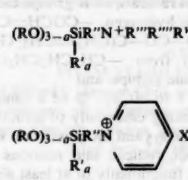
**Lynne M. B. Blank, Brighton, N.Y.; Thomas D. Boyce, and William C. White, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.**

**Division of Ser. No. 191,945, May 9, 1988, Pat. No. 4,990,338. This application Dec. 5, 1990, Ser. No. 622,653**

**Int. Cl.[5] A61F *13/00*; A61K *9/70*; A01N *55/00***

**U.S. Cl. 424—443** **6 Claims**

1. The method of inhibiting the proliferation of potentially destructive microorganisms on a substrate comprising treating the substrate with an effective amount of an antimicrobial superabsorbent composition formed of a crosslinked hydrophilic sodium salt form of a partially neutralized acrylic acid based polymer gel, the polymer gel having covalently bonded thereto an organosilane, the organosilane being present in an amount to prevent hydrophobing and reduction of the absorbent capacity of the polymer gel, the organosilane having a formula selected from the group consisting of



wherein in each formula,

R is an alkyl radical of 1 to 4 carbon atoms or hydrogen;

a has a value of 0, 1 or 2;

R' is a methyl or ethyl radical;

R'' is an alkylene group of 1 to 4 carbon atoms;

R''', R'''' and $R^v$ are each independently selected from the group consisting of alkyl radicals of 1 to 18 carbon atoms, $—CH_2C_6H_5$, $—CH_2CH_2OH$, $—CH_2OH$, and $—(CH_2)_xNCH(O)R^{vi}$, wherein x has a value of from 2 to 10 and $R^{vi}$ is a perfluoroalkyl radical having from 1 to 12 carbon atoms; and X is chloride, bromide, fluoride, iodide, acetate or tosylate.

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**5,035,893**

**WOUND COVERING**

**Nobuyuki Shioya, Yokohama; Yoshimitsu Kuroyanagi, Hachioji; Yasuo Kounami, and Tatsuhiko Kobayashi, both of Sagamihara, all of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan**

**Filed Nov. 22, 1989, Ser. No. 440,197**

**Claims priority, application Japan, Nov. 29, 1988, 63-301856**

**Int. Cl.⁵ A61F** *13/02;* **A61K** *9/70;* **A61L** *15/03, 15/06*

**U.S. Cl. 424—447** **13 Claims**

1. A laminate wound covering comprising a sheet of biopolymeric material selected from the group consisting of collagen, gelatin, alginic acid, chitin, chitosan, fibrin, dextran and polyamino acids, for contacting said wound and a film of a polyurethane resin in contact with said biopolymeric material sheet having a water-vapor permeability of 2,000 $g/m^2$·24 hrs. or more which is obtained by reacting a diisocyanate and a random copolymer of tetrahydrofuran and ethylene oxide to produce a urethane prepolymer, and extending the molecular chain of said prepolymer by using a chain extender, said random copolymer having 20 to 80% by weight of the ethylene oxide unit in the molecular chain thereof and having a number-average molecular weight of 800 to 3000.

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**5,035,894**

**CONTROLLED RELEASE COMPOSITIONS AND TRANSDERMAL DRUG DELIVERY DEVICE**

**Chi-Long Lee, Midland, and Katherine L. Ulman, Sanford, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.**

**Division of Ser. No. 109,157, Oct. 15, 1987, Pat. No. 4,898,920. This application Sep. 8, 1989, Ser. No. 405,009**

**Int. Cl.⁵ A61K** *9/70*

**U.S. Cl. 424—448** **39 Claims**

1. A controlled release composition comprising:

(1) a pressure sensitive adhesive composition consisting essentially of

(A) about 10 to 99 wt. % of a random graft copolymer having the average formula

$$R_3Si(OSiR_2)_x(OSiR)_yOSiR_3$$
$$\quad\quad\quad\quad\quad\quad | $$
$$\quad\quad\quad\quad G—(CH_2CH_2O)_zM$$

wherein x/y is in the range of 0.01 to 100, inclusive; x+y is in the range of 10 to 1000, inclusive; z is a number less than or equal to 15; R is selected from the group consisting of alkyl radicals having 1 to 8 carbon atoms, aryl radicals, and haloalkyl radicals; all R groups can be the same or different; M is hydrogen, $—COCH{=}CH_2$, or $—CO—NH(CH_2)_2—O—CO—C(CH_3){=}CH_2$; G is a divalent radical selected from $—CH_2CH_2CH_2O—$, $—CH_2CH_2O—$, or urethane groups; and

(B) correspondingly about 1 to 90 wt. % of a random resinous copolymer consisting essentially of structural units of the formula $(R^3)_3SiO_{0.5}$ and $SiO_2$, wherein $R^3$ is a monovalent hydrocarbon radical, said resinous copolymer having an SiOH functionally of at least about 0.5 wt. %; and

(2) a bioactive or chemical agent dispersed through said pressure sensitive adhesive composition.

**5,035,895**

**EMULSIFIED AND SOLUBILIZED PHARMACEUTICAL PREPARATION**

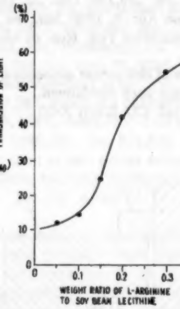
**Koichi Shibusawa, Gunma, and Shigemitsu Ohsawa, Saitama, both of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan**

**Filed Jan. 20, 1989, Ser. No. 300,407**

**Claims priority, application Japan, Jan. 22, 1988, 63-12063**

**Int. Cl.⁵ A61K** *37/22*

**U.S. Cl. 424—450** **8 Claims**




1. A transparent, clear aqueous preparation consisting essentially of a fat-soluble substance selected from the group consisting of vitamin E, vitamin E acetate, coenzyme Q10, vitamin A, an aliphatic ester of vitamin C, gamma-linolenic acid and vegetable oils, said fat-soluble substance being emulsified or solubilized in the aqueous phase in the presence of a phosphatide, a polyhydric alcohol and a compound selected from the group consisting of basic amino acids, salts of basic amino acids and N-methylglucamine, the amount of said compound being from 0.1 to 0.5 parts by weight, per one part by weight of said phosphatide.

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**5,035,896**

**WATER INSOLUBLE DRUGS COATED BY COACERVATED FISH GELATIN**

**Marilyn A. Apfel, Bedminster; Isaac Ghebre-Sellassie, Stanhope, and Russell U. Nesbitt, Somerville, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.**

**Filed Jun. 15, 1988, Ser. No. 207,361**

**Int. Cl.⁵ A61K** *9/50, 9/64*

**U.S. Cl. 424—456** **9 Claims**

1. A composition comprising a solid particulate water insoluble drug which is microencapsulated with a gelatin solution by coacervation and fixation at ambient temperature wherein the gelatin is fish gelatin.

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**5,035,897**

**DOSAGE FORM FOR DELIVERING SOLUBLE OR INSOLUBLE DRUGS**

**Atul D. Ayer; Anthony L. Kuczynski, and Patrick S. Wong, all of Palo Alto, Calif., assignors to Alza Corporation, Palo Alto, Calif.**

**Filed Sep. 5, 1989, Ser. No. 403,523**

**Int. Cl.⁵ A61K** *9/24*

**U.S. Cl. 424—473** **6 Claims**

1. A dosage form for administering a drug to a warm-blooded animal, wherein the dosage form comprises:

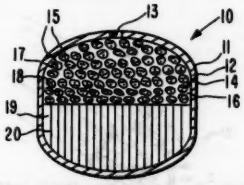
(a) a wall that surrounds;

(b) a compartment;

(c) a layer in the compartment comprising granules, the granules comprising a film comprising a polyvinylpyrrolidone polymer comprising a 10,000 to 500,000 molecular weight, that surrounds a drug possessing a solubility of 1 part of drug in less than 1 part of aqueous solvent to 1 part of drug in more than 10,000 parts of aqueous solvent, and

a hydroxyalkylcellulose comprising a 10,000 to 1,000,000 molecular weight;

(d) a layer in the compartment comprising a composition that imbibes fluid, consumes space and displaces the drug from the dosage form; and




(e) at least one exit passageway in the wall that connects the exterior with the interior of the dosage form for delivering the drug to the warm-blooded animal over a prolonged period of time.

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5,035,898

## POTASSIUM/MAGNESIUM SUPPLEMENT

**Richard R. Chang, Miramar, and Edward M. Rudnic, Boca Raton, both of Fla., assignors to Schering Corporation, Kenilworth, N.J.**

**Filed Nov. 27, 1987, Ser. No. 125,831**

**The portion of the term of this patent subsequent to Sep. 5, 2006, has been disclaimed.**

**Int. Cl.[5] A61K** *9/28*

**U.S. Cl. 424—474** **17 Claims**

1. A pharmaceutical composition for oral administration of potassium chloride and a magnesium salt comprising:

7.5 to 35 milliequivalents of a pharmaceutically acceptable magnesium salt; and

coated potassium chloride crystals comprising 10 to 20 milliequivalents of potassium chloride, wherein the coated potassium crystals are comprised of potassium chloride crystals being in the range of about 68% to about 86.5% by weight based on the total weight of the coated crystals and a coating material for the individual potassium chloride crystals, the coating material comprising in an amount in the range of about 9% to about 15% by weight based on the total weight of the coated crystals and at least one member selected from the groups consisting of hydroxypropylcellulose and polyethylene glycol in an amount in the range of about 0.5% to about 3% by weight based on the total weight of the coated crystals.

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5,035,899

## PERORAL PREPARATION OF ACID-UNSTABLE COMPOUND

**Yasuharu Saeki, Tsukuba; Noritoshi Koyama, Ibaraki; Sumio Watanabe, Aichi, and Shigeru Aoki, Gifu, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan**

**Filed Apr. 4, 1989, Ser. No. 332,731**

**Claims priority, application Japan, May 18, 1988, 63-121233**

**Int. Cl.[5] A61K** *9/36*

**U.S. Cl. 424—480** **6 Claims**

1. A peroral preparation of a benzimidazole compound, which consists essentially of:

(1) a core containing a pharmacologically effective amount of a pharmacologically effective, acid-unstable benzimidazole compound,

(2) a slightly water-soluble first coating layer, coated on the core, comprising

a slightly water-soluble, film-forming material selected from the group consisting of ethyl cellulose and polyvinyl acetate and

fine particles of a slightly water-soluble substance selected from the group consisting of magnesium oxide, silicic anhydride, calcium silicate, magnesium hydroxide, magnesium carbonate, aluminum hydroxide, calcium stearate, magnesium stearate and sucrose fatty acid esters suspended in the first layer, and

(3) a second coating layer, coated on the first layer, of an enteric polymer film.

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5,035,900

## METHODS OF DRYING BIOLOGICAL PRODUCTS

**John Langley, Shipley; Kenneth C. Symes, Keighley, both of Great Britain, and Peter Holm, Stenlose, Denmark, assignors to Allied Colloids Ltd., England**

**Filed Aug. 24, 1989, Ser. No. 398,057**

**Claims priority, application United Kingdom, Aug. 24, 1988, 8820061; Aug. 24, 1988, 8820062; Jan. 19, 1989, 8901183; Jan. 19, 1989, 8901193**

**Int. Cl.[5] A61K** *9/14, 9/50, 31/695*

**U.S. Cl. 424—484** **12 Claims**

1. A process for making particles containing biologically produced material selected from the group consisting of enzymes, fungi, spores, bacteria, cells and antibiotics, in a matrix of polymeric material comprising:

mixing film-forming polymeric material selected from the group consisting of water soluble polymers and oil-in-water emulsions of alkaline soluble polymers, the said polymeric material bring in an amount of at least 0.5 times that of the biologically produced material on dry weight basis, with an aqueous liquor that is a fermentation broth concentrate containing the said biologically produced material and thereby forming an aqueous polymer phase throughout which the biologically produced material is substantially uniformly distributed,

simultaneously or subsequently dispersing the said aqueous polymer phase in a water immiscible liquid in the presence of a dispersion stabilizer and thereby forming a substantially stable dispersion of the said aqueous polymer phase in the said water immiscible liquid, and

azeotropically distilling the dispersion at a temperature that is below 70° C. and at which deactivation of the biologically produced material does not occur, and thereby forming substantially dry particles each comprising a matrix formed of polymeric material and the biologically produced material dispersed substantially uniformly throughout the matrix, wherein the particles are beads having a size of from 30 μm to 2 mm or the particles have a size of below 10 μm and are present as a stable dispersion of the particles in the water immiscible liquid.

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5,035,901

## BONE INDUCING AGENT FROM A HUMAN OSTEOSARCOMA CELL LINE

**H. Clarke Anderson, Shawnee Mission, Kans., and Kazuomi Sugamoto, Oyodoku Osaka, Japan, assignors to University of Kansas, Kansas City, Kans.**

**Filed Oct. 9, 1987, Ser. No. 107,299**

**Int. Cl.[5] A61K** *35/12;* **C12N** *5/08*

**U.S. Cl. 424—573** **3 Claims**

1. Method for inducing bone formation in a mammal which comprises treating a mammal in need of bone formation or healing with an amount of devitalized, freeze dried Saos-2 cells sufficient to promote bone healing or bone formation.

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5,035,902

## FOAM STABILIZING PROTEINASE

**Carl Bilinski; Hoyeon Choi, both of London, and Keith Mussar, Kitchener, all of Canada, assignors to Labatt Brewing Company Limited, London, Canada**

**Filed Jun. 12, 1989, Ser. No. 364,168**

**Int. Cl.[5] C12G** *1/00*

**U.S. Cl. 426—12** **29 Claims**

1. A process for the production of a protein-containing beverage, comprising the step of hydrolysing chill-haze-pro-

ducing proteins contained in the protein-containing beverage with a proteolytic amount of proteolytic, Candida enzyme preparation in the absence of non-indigenous beer wort protein concentrations sufficient to substantially increase foam stability in the beverage.

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**5,035,903**

## HIGH FIBER BAKERY PRODUCTS

**Roy F. Silva, Norwalk, Conn., assignor to International Flavors & Foods Ingredients Company, division of Indopco, Inc., Del.**

**Continuation-in-part of Ser. No. 755,871, Jul. 17, 1985, abandoned. This application Jun. 2, 1986, Ser. No. 869,477**

**Int. Cl.[5] A21D** *2/36*

**U.S. Cl. 426—19** **16 Claims**

1. Yeast-raised bakery products containing added dietary fiber in an amount ranging from about 5% to about 25% by weight based on the weight of the flour in the dough of the bakery product, wherein said dough contains from about 0.25% to about 3% by weight of the flour in the product of a functionalized dairy product having a viscosity of about 200 centipoises at a shear rate of $12s^{-1}$ prepared by fermenting a polymer-producing microorganism of the genus Xanthomonas or Leuconostoc with a dairy based substrate containing a growth-supporting carbohydrate source for said microorganism.

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**5,035,904**

## STARCH-BASED PRODUCTS FOR MICROWAVE COOKING OR HEATING

**Victor T. Huang, Moundsview, Minn.; R. Carl Hoseney, Manhattan, Kans.; Ernst Graf, New Brighton, Minn.; Katy Ghiasi, St. Anthony, Minn.; Linda C. Miller, St. Louis Park, Minn.; Jean L. Weber, Minneapolis, Minn.; Karin C. Gaertner, Blaine, Minn.; Kristin L. Matson, Coon Rapids, Minn.; Antoinette M. Hunstiger, Edina, Minn.; Deborah K. Rogers, Manhattan, Kans., and Israel A. Saguy, Edina, Minn., assignors to The Pillsbury Company, Minneapolis, Minn.**

**Continuation of Ser. No. 213,075, Jun. 29, 1988, abandoned. This application Jul. 30, 1990, Ser. No. 571,041**

**Int. Cl.[5] A21D** *8/00*

**U.S. Cl. 426—243** **34 Claims**

1. A method for producing an edible starch-based bread-type product having a desired degree of toughness, the method comprising the steps of:

forming a dough comprising water, flour and a texturizing agent selected from the group consisting of surfactants, hydrogen bond-breakers, fast acting oxidants, enzymes, and disulfide-reactants, the texturizing agent being included in an amount sufficient to provide a degree of toughening of the edible product when subjected to microwave irradiation which is distinguishably less than the degree of toughening generated from a dough which is formed without the texturizing agent;

preparing a product intermediate from said dough, and

exposing said product intermediate to microwave irradiation for a time sufficient to produce a desired edible product, said edible product having at least about 15 weight percent total water.

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**5,035,905**

## METHODS FOR FORMING A FOLD-OVER SOFT CENTER-FILLED CONFECTION

**Leslie F. Knebl, Morristown, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.**

**Division of Ser. No. 253,793, Oct. 4, 1988, Pat. No. 4,949,630. This application Jun. 8, 1990, Ser. No. 535,077**

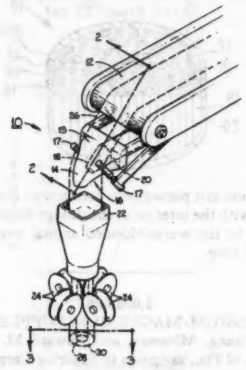
**Int. Cl.[5] A23G** *00/00*

**U.S. Cl. 426—284** **5 Claims**

1. A process for forming a center-filled confectionery rope, comprising the steps of:

providing an outer layer of a confectionery mass as a continuous rectangular sheet by delivery on a substantially planar delivery mass;

forming the outer layer of confectionery mass from said continuous rectangular sheet into a continuous hollow cylinder in the absence of deforming said delivery means;



providing a soft confectionery mass; and

extruding a continuous flow of the soft confectionery mass into the hollow center of the cylinder during the formation of the cylinder.

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**5,035,906**

## BISCUIT AND PROCESS OF PREPARATION

**Tyko Persson, Morges; Hériber Duc, Orbe, and Marcel Buhler, Tolochenaz, all of Switzerland, assignors to Nestec S.A., Vevey, Switzerland**

**Continuation of Ser. No. 820,903, Jan. 16, 1986, Pat. No. 4,650,685, which is a continuation of Ser. No. 558,486, Dec. 6, 1983, abandoned. This application Oct. 21, 1986, Ser. No. 921,318**

**Claims priority, application Switzerland, Dec. 30, 1982, 7624/82**

**The portion of the term of this patent subsequent to Mar. 17, 2004, has been disclaimed.**

**Int. Cl.[5] A21D** *13/08*

**U.S. Cl. 426—285** **15 Claims**

1. A process for preparing a biscuit, which comprises:

subjecting a base, which comprises from 40 to 80 parts by weight of wheat flour, form 0 to 20 parts by weight of sucrose, from 0.5 to 3 parts by weight of oil or fat and from 0 to 3 parts by weight of water, at a temperature of between 140° C. and 180° C. to a pressure of from 80 to 120 bars and then extruding the base through an extrusion nozzle to release an expanded, cooked base;

reducing the expanded base to granules;

adding a binder, which comprises from 5 to 15 parts by weight of water and from 8 to 30 parts by weight of glucose syrup having a dynamic viscosity of from 100 to 300 mPa at from 20° to 30° C., to the base mixing the binder and base for from 2 to 5 minutes at a temperature of from 20° to 30° C. to coat and partially impregnate the granules and form a viscous, sticky mass;

moulding portions of the mass into shapes under pressure sufficient to compact the mass while preserving the structure of the granules; and

drying the moulded portions to a moisture content of from 1.5 to 4% by weight.

7. A biscuit which comprises agglomerated granules of an expanded cooked base which are coated with a binder, the base comprising from 40 to 80 parts by weight of wheat flour, from 0 to 20 parts by weight of sucrose and from 0.5 to 3 parts by weight of oil or fat, the binder comprising from 8 to 30 parts by

weight of a material selected from the group consisting of sucrose and a mixture of glucose and its polymers, and mixtures thereof, the food product having a density of from 0.3 to 0.8 g/cm$^3$, and having a shear resistance such that the maximum force required to break the product in two is from about 10 N to about 30 N.

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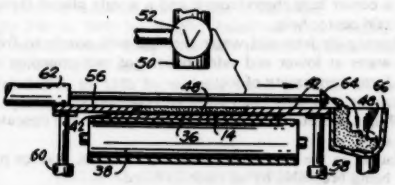
5,035,907

## METHOD OF MAKING AND USING AN ASSEMBLY FOR DECORATING PASTRIES

Charles A. Phillips, and Mortimer D. Phillips, both of White Plains, N.Y., assignors to Leonard Baking Co., Inc., Port Chester, N.Y.

Filed Jul. 31, 1989, Ser. No. 386,618
Int. Cl.[5] A23G 3/00
U.S. Cl. 426—383 10 Claims




1. A method of making and using an assembly including an edible, transferrable, hardenable, sheet-like, decorative overlay for decorating a pastry, comprising the sequential steps of:

(a) providing a flat, rigid carrier sheet having an upper surface;

(b) mounting a flexible, sheet-like, plastic release film on the carrier sheet by an adhesive bond by applying a sheet-like adhesive layer entirely over the upper surface of the carrier sheet and pressing the release film entirely over, and in surface contact with, the adhesive layer;

(c) forming said edible, transferrable, hardenable, sheet-like, decorative overlay in situ on the release film, by associating a fluid mixture with said release film and allowing said fluid mixture to harden to form said overlay such that said hardened, sheet-like, decorative overlay clings to, and is entirely in surface contact with, the release film upon hardening of the overlay, said carrier sheet being of sufficient rigidity to protect said hardened overlay during transport and handling, and said adhesive bond formed by said adhesive layer being sufficient such that it holds said plastic release film and said clinging overlay on said carrier sheet but is easily overcome when a user peels said release film with said overlay thereon from said carrier sheet by exerting a pulling force, said plastic release film being such that it allows a user to peel said film from said overlay after said film has been peeled from said carrier sheet without damaging said overlay;

(d) then peeling the release film and the clinging overlay together as a unit from the carrier sheet by successively breaking surface contact between the release film and the carrier sheet;

(e) subsequently peeling the release film from the overlay by successively breaking surface contact between the release film and the overlay; and

(f) then transferring the separated overlay itself to the pastry to decorate the same.

5,035,908

## EVAPORATIVE PROCESS FOR PRODUCING COFFEE GLASS

Vijay K. Arora, Montvale, N.J.; Gary V. Jones, Bremen, Fed. Rep. of Germany; John M. Kovtun, Rahway, and Ronald G. Gabbard, Iselin, both of N.J., assignors to Kraft General Foods, Inc., Glenview, Ill.

Continuation of Ser. No. 231,810, Aug. 12, 1988, abandoned.
This application May 7, 1990, Ser. No. 518,268
Int. Cl.[5] A23F 5/26
U.S. Cl. 426—388 3 Claims

1. A process for preparing an improved soluble coffee product comprising:

(a) evaporating a totally coffee extract to at least 45% totally coffee-derived solids;

(b) recovering an aroma from the totally coffee extract either prior to and/or during said evaporation;

(c) further evaporating said totally coffee extract of at least 45% totally coffee-derived solids to a viscoelastic fluid of 91 to about 96% totally coffee-derived solids by forming a thin film of concentrated extract on a heated evaporator wall and propelling the extract down the wall in a thin film by use of rotating blades having a wall clearance of about $\frac{1}{4}$ inch while maintaining the fluid at 80° to 100° C.;

(d) collecting said fluid and pumping said fluid through a confined pressurized headspace mixing zone where coffee aroma is added and thoroughly mixed into the fluid;

(e) rapidly cooling the mixture to trap the coffee aroma within a brittle coffee glass, the solids content of which is 100% coffee-derived with a retention of said coffee aroma of at least 80% or more of volatiles; and

(f) grinding and sizing the mixture and drying if necessary to a stable moisture content of less than 6% water.

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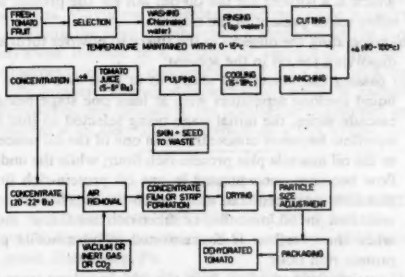
5,035,909

## PROCESS FOR DEHYDRATING TOMATOES

Juan M. Lomelin, and Maria C. Vaqueiro, both of Legaria, Mexico, assignors to Imit, A.C., Mexico

Filed Aug. 7, 1990, Ser. No. 564,034
Int. Cl.[5] A23B 7/00
U.S. Cl. 426—473 13 Claims




1. A process for dehydrating tomatoes, comprising the steps of:

(a) selecting red, ripe tomato fruit having a firm texture;

(b) washing the selected tomato fruit with a biocide and rinsing with fresh water;

(c) cutting the rinsed fruit into approximately cubical chunks;

(d) blanching the tomato chunks by heating the chunks to a temperature at or below the boiling point of water for a period of time less than about 10 minutes to inactivate the enzymes contained in the tomato chunks;

(e) cooling the blanched tomato chunks to approximately room temperature;

(f) pulping the cooled tomato chunks and removing skin and seeds from the pulped chunks to form a tomato juice;

(g) evaporating the tomato juice under vacuum to form a

tomato paste-like concentrate having a solids content of from about 20% to 32%;

(h) removing the air trapped within the concentrate;

(i) forming the concentrate into pieces having a maximum thickness or diameter of from about 1 mm to about 3 mm; and drying the concentrate pieces until the moisture content of said pieces is between about 3% to about 4%.

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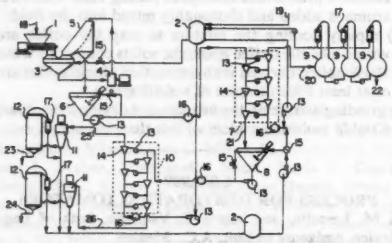
**5,035,910**

## SEPARATION OF OILSEED COMPONENTS IN SOLVENT PHASE

**John D. Jones, Ottawa, and Douglas S. McGinnis, Lacombe, both of Canada, assignors to Her Majesty the Queen in right of Canada, as represented by the Minister of Agricuture, Ottawa, Canada**

**Filed Feb. 14, 1990, Ser. No. 480,021**
**Int. Cl.[5] H23L *1/20***
**U.S. Cl. 426—478** **15 Claims**



1. A process for separating oilseeds into high quality oil and protein-rich flour components, and a fibrous seed coat meal component, comprising:

(a) slurrying intact clean oilseeds with a non-aqueous solvent which is a solvent for the oil but not for the protein and other solids present in the oilseeds,

(b) macerating the oilseeds in the slurry to powder form and dissolving the oil in the solvent;

(c) passing the macerated slurry to at least two stages of liquid cyclone separators with at least one stage being a cascade series, the initial stage being selected so that the overflow becomes concentrated in one of the oil miscella or the oil miscella plus protein-rich flour; while the underflow becomes concentrated in one of: protein-rich flour plus fiber-rich seed coat meal, when the overflow is concentrated in oil miscella, or fiber-rich seed coat meal, when the overflow is concentrated in oil miscella plus protein-rich flour,

(d) passing the underflow from the initial cyclone stage (c) to a second liquid cyclone separator stage, said second stage being selected so that the overflow becomes concentrated in the protein-rich flour when present or in solvent when the flour is absent; while the underflow becomes concentrated in the fiber-rich seed coat meal,

(e) passing the overflow from (c) to one of the following stages i) when protein-rich flour is present, a third liquid cyclone separator stage selected so that the overflow will become concentrated in oil miscella and the underflow in protein-rich flour, and ii) when protein-rich flour is absent, an oil-solvent separation stage, and

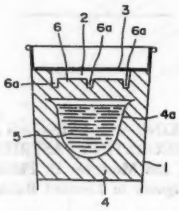
(f) recovering oil from the miscella overflow from (e)i) or from said separation state (e)ii); protein-rich flour from the overflow from (d) or the underflow from (e)i); and seed coat meal from the underflow from (d).

**5,035,911**

## PROCESS OF PRODUCING LIQUOR-INCLUDED ICE

**Katsuzo Somura, 4-4, Chuo 5-chome, Nakano-ku, Tokyo, Japan**

**Division of Ser. No. 484,418, Feb. 26, 1990, Pat. No. 5,013,562.**
**This application Feb. 11, 1991, Ser. No. 636,736**
**Claims priority, application Japan, Oct. 6, 1989, 1-261668**
**Int. Cl.[5] A23P *1/00***
**U.S. Cl. 426—515** **4 Claims**



1. A process for producing a liquor included ice comprising:

filling a predetermined amount of water in a glass-like container;

covering said container with a heat-proof lid, said lid having a center hole therethrough and a nozzle placed through said center hole;

blowing air into said water through said nozzle to freeze water at lower and side portions of said container and form a concavity of ice;

draining unfrozen water from said concavity;

filling a predetermined amount of a liquor in said concavity; and

placing an ice plate to seal said liquor in ice, said ice plate being breakable by an external force.

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**5,035,912**

## STARCH JELLY CANDY

**Susan L. Furcsik, Lake Station, Ind., and David J. Mauro, Dolton, Ill., assignors to American Maize-Products Company, Stamford, Conn.**

**Filed Jun. 19, 1990, Ser. No. 540,360**
**Int. Cl.[5] A23G *3/00*; A23L *1/0522***
**U.S. Cl. 426—578** **18 Claims**

1. A starch jelly candy comprising a cooked gelled starch formulation wherein said formulation having contained:

(a) a sweetener;

(b) about 1% to about 25% by weight of a starch composition comprising:

(i) about 10% to about 90% by weight a first starch, said first starch being a starch from a plant of the dully horny homozygous genotype; and

(ii) about 90% to about 10% by weight a second starch, said second starch obtained from a plant having a homozygous genotype and selected from the group consisting of amylose extender dull, amylose extender sugary-2, amylose extender dull shrunken-1, dull sugary-2, and mixtures thereof: and

(c) water.

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**5,035,913**

## PROCESS OF MAKING MICROWAVABLE OATMEAL COMPOSITION

**Phillip Sky, Altoona, Pa., assignor to To Market, Two Markets, Inc., Altoona, Pa.**

**Filed Sep. 22, 1989, Ser. No. 411,040**
**Int. Cl.[5] A23L *3/00***
**U.S. Cl. 426—619** **19 Claims**

1. A process for preparing a complete oatmeal composition, said process comprising:

cooking steel cut oats in a manner so that the material is hydrated;

adding rolled oats after a cooking time such that cooking of the steel cut oats is substantially complete;
adding optionally hydrated oat bran either before or after addition of the rolled oats;
cooking the entire mixture for a time sufficient to render the product edible; and packaging the product by a process comprising:
adding an acidic modifier to the cookable oat mixture;
filling containers with the cooked oat mixture;
inverting the filled container to allow hot air to rise through the container; and
cooling the oatmeal.

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**5,035,914**

## CREAMY ORANGE SNACK CEREAL

**Richard A. Doerr, 2 Thornton Ct., South Plainfield, N.J. 07080**

**Filed Apr. 4, 1990, Ser. No. 503,914**
**Int. Cl.[5] A23P *1/14;* A23L *1/18***
**U.S. Cl. 426—621** **10 Claims**

1. A food product for snack or as a breakfast cereal which has a simulated non-dairy cream and orange flavor, which comprises:

(a) 40% to 95% weight of a puffed cereal base selected from oat, wheat, rye, soy, corn and rice, and combinations thereof, based on total weight of the food;

(b) 2% to 20% by weight, based on total weight, of a vanillin based dairy substitute product which simulates cream flavor; and,

(c) 0.05% to 15% by weight, based on total weight, of powdered orange or artificial orange flavor.

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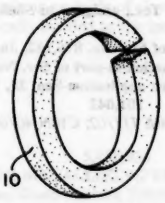
**5,035,915**

## HELICAL SPLIT RING FRENCH FRY

**George A. Mendenhall, 4252 S. Eagleson Rd., Boise, Id. 83705**

**Division of Ser. No. 472,714, Jan. 31, 1990, Pat. No. 5,010,796.**
**This application Jul. 6, 1990, Ser. No. 549,127**
**Int. Cl.[5] A23L *1/217***
**U.S. Cl. 426—637** **1 Claim**




1. A cut potato piece, having a uniform cross sectional area, formed in the shape of a helical split ring, wherein the distance between the ends of the cut potato piece defining the split is smaller than the cross sectional area of the cut potato piece.

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**5,035,916**

## OPTICAL WAVEGUIDE AND METHOD FOR ITS MANUFACTURE

**Alexander Kalnitsky; Joseph P. Ellul, and Albert R. Boothroyd, all of Nepean, Canada, assignors to Northern Telecom Limited, Montreal, Canada**

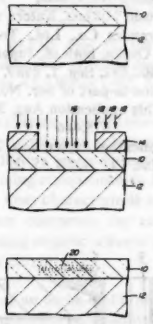
**Division of Ser. No. 363,006, Jun. 8, 1989, Pat. No. 4,934,774.**
**This application Mar. 28, 1990, Ser. No. 501,990**
**Int. Cl.[5] C23C *14/04, 14/14, 14/18, 14/48***
**U.S. Cl. 427—38** **11 Claims**

1. A method for making a planar optical waveguide, the method comprising:

forming a layer of $SiO_2$ on a substrate;

forming an ion implantation mask over the $SiO_2$ layer, the ion implantation mask having openings therethrough over regions of the $SiO_2$ layer where an optical waveguide channel is desired; and

selectively implanting a region of the $SiO_2$ layer with Si ions



through the openings of the ion implantation mask to define a planar optical waveguide comprising a channel region having an elevated refractive index surrounded by a region having a lower refractive index.

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**5,035,917**

## METHOD OF PREPARING LAYERS OF VINYLIDENE FLUORIDE POLYMERS AND VINYLIDENE FLUORIDE/TRIFLUOROETHYLENE COPOLYMERS ON A SUBSTRATE

**Johann Kammermaier, Unterhaching, and Gerhard Rittmayer, Erlangen, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed May 25, 1990, Ser. No. 529,246**
**Claims priority, application Fed. Rep. of Germany, Jun. 22, 1989, 3920535**
**Int. Cl.[5] B05D *3/06***
**U.S. Cl. 427—41** **19 Claims**

1. A method of preparing layers of vinylidene fluoride polymers and vinylidene fluoride/trifluoroethylene copolymers comprising the steps of subjecting a monomer in the form of vinylidene fluoride or a mixture of vinylidene fluoride and trifluoroethylene in a concentration of $<5\times10^{-9}$ mol/cm$^3$ to a low pressure plasma polymerization which is excited by microwaves, and depositing the polymer or copolymer onto a substrate at an electric field strength of <850 V/cm.

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**5,035,918**

## NON-FLAMMABLE AND STRIPPABLE PLATING RESIST AND METHOD OF USING SAME

**Navin N. Vyas, Winston-Salem, N.C., assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed Apr. 26, 1989, Ser. No. 343,764**
**Int. Cl.[5] B05D *3/06, 5/12;* H01L *21/306***
**U.S. Cl. 427—53.1** **5 Claims**

1. A method for the selective plating of a nickel plated electrically conductive substrate, comprising the steps of applying a thin, uniform layer of a resistant containing styrene acrylic co-polymer, butyl cellosolve, butyl carbonil, and water, and possessing a flashpoint of no less than 100° F., onto said substrate, drying said resist in situ, where said dried resist is (a) highly transparent to the wavelength of an excimer laser operating in the U.V. range so that the laser energy may be absorbed by said metal substrate, and (b) resistant to deterioration in chemical plating solutions, subjecting selected areas of said dried resist to a controlled excimer laser pulse to remove the resist within said areas, plating the exposed areas of said substrate with a precious metal, and stripping said resist from the remaining portions of said metal substrate.

5,035,919

## REPAIRING MATERIAL OF A BRICK AND A METHOD OF REPAIRING A BRICK

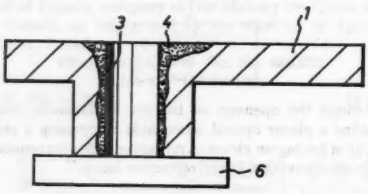
Takao Sugino, Handa; Toshio Kawamura, Takahama; Masamichi Asai; Hiroshi Yamada, both of Kariya; Kenichi Mukoyama, Higashi-Murayama; Akira Takahashi, Namekata, and Hiroshi Hikima, Katori, all of Japan, assignors to Toshiba Ceramics Co., Ltd., Tokyo and Sumitomo Metal Indus., Ltd., Osaka, both of, Japan

Division of Ser. No. 402,692, Sep. 1, 1989, Pat. No. 4,970,180, which is a continuation-in-part of Ser. No. 211,837, Jun. 27, 1988, abandoned. This application Aug. 30, 1990, Ser. No. 575,446

Claims priority, application Japan, Jun. 29, 1987, 62-161933

Int. Cl.[5] B32B *35/00*

U.S. Cl. 427—140 2 Claims




1. A method of effecting a high strength repair of a plate-like brick used in a sliding gate for controlling a flow rate of high temperature liquid material, comprising the steps of:

Mixing 70 to 80 wt % of alumina having a grain size of 1 mm or less, which comprises 25 to 30 wt % of the above amount having a grain size of greater than 325 mesh and 45 to 50 wt % of the above amount having a grain size passing through a 325 mesh; 1 to 7 wt % of carbonaceous material having a grain size passing through a 60 mesh; 1 to 5 wt % of magnesia having a grain size passing through a 325 mesh; and 10 to 25% aluminum phosphate, thereby producing a refractory repairing material,

filling said produced repairing material into a damaged part of said brick while maintaining a temperature of said brick of less than about 100° C., and

allowing said repairing material to harden spontaneously.

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5,035,920

## TWO-STEP METHOD FOR INCREASING THE LIGHT-REFLECTIVITY OF AN OBJECT

Thomas J. Smrt, Marengo, and Abdul F. Khan, Hoffman Estates, both of Ill., assignors to Fox Valley Systems, Inc., Cary, Ill.

Filed Jul. 21, 1989, Ser. No. 383,822

Int. Cl.[5] B05D *1/36*

U.S. Cl. 427—202 8 Claims

1. A two-step method for increasing the reflex-reflectivity of a substrate, said method comprising first coating said substrate with a first aerosol coating composition to form a base-coating on said substrate, the first aerosol coating composition being dispensed from a self-pressurized aerosol dispenser means which contains said first coating composition and a propellant; and secondly coating said base-coating with a second aerosol coating composition to impart reflex-reflectivity to said base-coating, said second aerosol coating composition being dispensed from a self-pressurized aerosol dispenser means which contains said second coating composition and a propellant; said first coating composition comprising a binder resin and a solvent in which the binder resin is dissolved; said second coating composition comprising transparent microspheres having a particle size from about 45 to about 90 microns and a carrier in which the transparent microspheres are dispersible, said carrier also being capable of softening or partially dissolving the binder resin, in the base-coating; said binder resin when in a softened or partially dissolved state, being capable of adhering said transparent microspheres to said substrate; and said transparent microspheres exhibiting reflex-relectivity after application to said base-coating.

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5,035,921

## PROCESSING OF CARBON/CARBON COMPOSITES USING SUPERCRITICAL FLUID TECHNOLOGY

Philip L. Berneburg, Potomac, Md., and Val J. Krukonis, Lexington, Mass., assignors to The Babcock & Wilcox Company, New Orleans, La.

Filed Jan. 19, 1988, Ser. No. 145,071

Int. Cl.[5] B05D *3/02*

U.S. Cl. 427—226 15 Claims

1. A process for increasing the oxidation resistance of a porous carbon/carbon composite comprising the steps of:

dissolving a ceramic precursor selected from the group consisting of polycarbosilane, polysilane, and n-hexylcarborane in a supercritical fluid;

infiltrating the carbon/carbon composite with the ceramic precursor-laden supercritical fluid;

reducing the pressure of the ceramic precursor-laden supercritical fluid to decrease the solubility of the ceramic precursor in the fluid to precipitate the ceramic precursor within the internal porosity of the carbon/carbon composite and thereby impregnate the carbon/carbon composite; and

pyrolyzing the impregnated composite.

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5,035,922

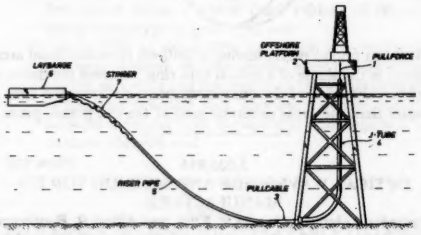
## REDUCED J-TUBE RISER PULL FORCE

Paul E. Titus, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 876,152, Jun. 19, 1986, abandoned, and a continuation-in-part of Ser. No. 876,153, Jun. 19, 1986, abandoned. This application Sep. 25, 1987, Ser. No. 101,042

Int. Cl.[5] F16L *1/18;* C10M *111/02;* C10N *40/00;* F16N *15/00*

U.S. Cl. 427—239 2 Claims




1. A method for reducing the force required to move a pipe through a J-tube attached to an offshore platform, comprising:

covering the pipe with at least one of (a) a slippery coating and (b) a slippery surface, each comprising hydrophilic polymer;

reacting a polyol with the hydrophilic polymer to make the hydrophilic polymer slippery; and

moving the pipe through the J-tube attached to the off-shore platform.

5,035,923

## PROCESS FOR THE DEPOSITION OF HIGH TEMPERATURE STRESS AND OXIDATION RESISTANT COATINGS ON SILICON-BASED SUBSTRATES

Vinod K. Sarin, Lexington, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Division of Ser. No. 250,980, Sep. 23, 1988, Pat. No. 4,950,558, which is a continuation of Ser. No. 103,332, Oct. 1, 1987, abandoned. This application May 21, 1990, Ser. No. 526,365

Int. Cl.[5] C23C *16/00*; B05D *1/36*

U.S. Cl. 427—255 10 Claims

1. A process for depositing a high temperature stress and oxidation resistant coating on a silicon nitride- or silicon carbide-based substrate body comprising the steps of:

passing over the substrate, at a temperature of about 900–1500° C. and at a pressure between about 1 torr and about ambient pressure, a gaseous mixture comprising one or more halide vapors with other suitable reactant gases, and optionally a carrier gas, and at partial pressure ratios, at flow rates, and for times sufficient to deposit a continuous, fully dense, adherent coating; and

gradually varying the composition of the gaseous mixture during the deposition of the coating in such a way that the coating is a graded coating comprising at least two adherent layers, each deposited as a graded layer changing in composition from the material over which it is deposited to the material of the layer and, in the case of all except the outermost layer, further to the material deposited thereon, so that no clearly defined compositional interfaces exist between the substrate and the layers, or between the layers;

wherein the step of gradually varying the composition of the gaseous mixture comprises varying partial pressures of the vapors and gases according to a predetermined time schedule and selecting the halide vapors and other suitable reactant gases so that the at least two layers comprise (a) an adherent, continuous intermediate layer about 0.5–20 microns thick of an aluminum nitride material, over and chemically bonded to the substrate body; and (b) an adherent, continuous first outer layer about 0.5–900 microns thick comprising an oxide of aluminum or zirconium over and chemically bonded to the intermediate layer.

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5,035,924

## PROCESS FOR METALLIZING FIBROUS MATERIALS

Vincenzo Massa, Busto Arsizio; Fabrizio Merlo, Saronno, and Uberto Casolo Ginelli, Somma Lombardo, all of Italy, assignors to Himont Italia S.r.l., Milan, Italy

Continuation of Ser. No. 304,250, Jan. 31, 1989, abandoned. This application Mar. 27, 1990, Ser. No. 500,120

Claims priority, application Italy, Feb. 1, 1988, 19262 A/88

Int. Cl.[5] B05D *3/00*

U.S. Cl. 427—299 7 Claims

1. Method for the metallizing of fibrous materials by means of a chemical route, characterized in that said fibrous materials, before being subjected to the normal chemical treatment for metallizing, are uniformly coated with a continuous film of a polymer, which is capable of adhering to the fibrous material, is resistant to the chemical metallizing treatment, and is capable of receiving metal coatings, said polymer being selected from the group consisting of homopolymerized or copolymerized vinyl propionate, styrene, alpha-methyl-styrene, butadiene, with or without functional groups —OH, —COOH, —CN, —$NH_2$ or —$CONH_2$ type, this latter being optionally either methylolated or methoxylated, or a polymer of polyurethane nature, and thereafter metallizing said coated fibrous material.

5,035,925

## PROCESS FOR APPLYING TO A SUBSTRATE A COPOLYMER OF AN ALPHA-OLEFIN AND AN OLEFINICALLY UNSATURATED MONOANHYDRIDE

Karl F. Schimmel, Verona, and William P. Blackburn, Evans City, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 87,012, Aug. 19, 1987, Pat. No. 4,927,868. This application Jan. 29, 1990, Ser. No. 471,757

Int. Cl.[5] B05D *1/02, 1/18*

U.S. Cl. 427—386 13 Claims

1. A process for applying a composite coating to a substrate which comprises applying to the substrate a colored film-forming composition to form a base coat and applying to said base coat a clear film-forming composition to form a transparent top coat over the base coat characterized in that the clear film-forming composition comprises the curable liquid coating composition containing organic solvent and a resinous binder, said resinous binder comprising:

(a) a polyepoxide,

(b) a copolymer of an alpha-olefin or a cycloolefin and an olefinically unsaturated monoanhydride including a partial ester thereof; and

(c) a carboxy-terminated polyester polyacid curing agent containing at least two carboxyl groups per molecule;

said coating composition having a resin solids content of at least 40 percent by weight.

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5,035,926

## METHOD OF IMPARTING ANTISTATIC PROPERTIES TO A SUBSTRATE BY COATING THE SUBSTRATE WITH A NOVEL POLYTHIOPHENE

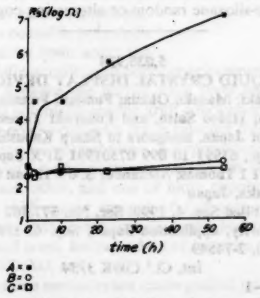
Friedrich Jonas, Aachen; Gerhard Heywang, Bergisch Gladbach; Werner Schmidtberg, Leverkusen; Jürgen Heinze, and Michael Dietrich, both of Freiburg, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Division of Ser. No. 337,498, Apr. 13, 1989, Pat. No. 4,959,430. This application Apr. 12, 1990, Ser. No. 508,889

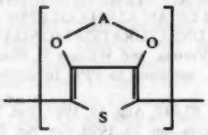
Claims priority, application Fed. Rep. of Germany, Apr. 22, 1988, 3813589; Dec. 23, 1988, 3843412

Int. Cl.[5] B05D *3/02*

U.S. Cl. 427—393.1 3 Claims




1. In a process for imparting antistatic properties on a substrate which only conducts electrical current poorly or not at all wherein a coating of an electroconductive organic polymer is applied onto the surface of the substrate, the improvement which comprises producing on the surface of the substrate a coating of a polythiophene which consists of structural units of the formula

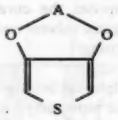


(I)

in which

A is an $C_1$–$C_4$-alkylene radical or a substituted $C_1$–$C_4$-alkylene radical,

by oxydative polymerization of a 3,4-disubstituted thiophene of the formula



(II)

in which

A has the meaning indicated under formula (I).

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**5,035,927**

**TONER FUSING DEVICE AND METHOD OF USING THE SAME**

**Tsang J. Chen, Rochester; Paul L. Nielsen, Lima, and Joseph A. Pavlisko, Pittsford, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jun. 26, 1990, Ser. No. 543,925**

**Int. Cl.[5] B05D *3/12*; B05C *11/00*; G03G *13/20***

**U.S. Cl. 427—444** **17 Claims**

1. A toner fusing device comprising a first member having a resilient surface for pressure contact with thermoplastic toner on a receiver sheet, a second member for pressing the receiver sheet into contact with said first member and means for heating the toner, said first member having a layer of an elastomeric amorphous silarylene-siloxane random or alternating copolymer.

11. A method of fusing thermoplastic toner powder to a receiver sheet which comprises

passing said receiver sheet having thermoplastic toner powder distributed on its surface through the nip formed by a fusing roll and a pressure roll while heating the toner,

said fusing roll in contact with the toner in the nip comprising a rigid core and a layer of an elastomeric, amorphous, silarylene-siloxane random or alternating copolymer.

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**5,035,928**

**LIQUID CRYSTAL DISPLAY DEVICE**

**Shyuichi Kozaki; Masako Okada; Fumiaki Funada; Kei Sasaki, all of Nara; Hideo Saito, and Fusayuki Takeshita, both of Chiba, all of Japan, assignors to Sharp Kabushiki Kaisha & Chisso Corp., 61991 10 099 07301991 JPX Japan 09061989 1-232372 6 1 1 Thomas; Alexander S. 6 9 11 and Chisso Corp., both of Osaka, Japan**

**Filed Sep. 4, 1990, Ser. No. 577,162**

**Claims priority, application Japan, Sep. 6, 1989, 1-232372; Mar. 23, 1990, 2-74549**

**Int. Cl.[5] C09K *3/34***

**U.S. Cl. 428—1** **6 Claims**

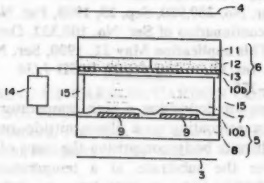
1. An active matrix type liquid crystal display device comprising

a first substrate having thereon a switching transistor and a picture element electrode at an intersection of a signal electrode and a scanning electrode,

a second substrate having a counter electrode at least on an area facing said picture element electrode,

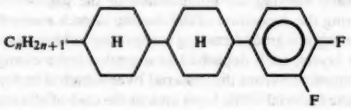
orientation films formed on said first and second with facing each other, and

a mixed liquid crystal layer held between said first and second substrates at a constant thickness,



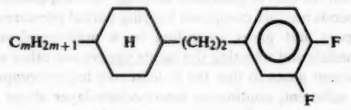

characterized in that said mixed liquid crystal comprises, as liquid crystal compound having a positive dielectric anisotropy,

(a) at least one liquid crystal compound represented by



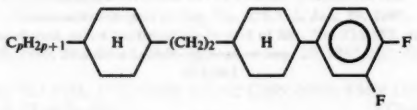

wherein n is an integer of 1 to 10,

(b) at least one liquid crystal compound represented by



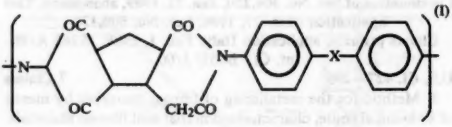

wherein m is an integer of 1 to 10, and

(c) at least one liquid crystal compound represented by




wherein p is an integer of 1 to 10, and

said orientation films are formed from a polyimide having a main chain represented by




(I)

wherein X represents 0, $CH_2$ or $C(CH_3)_2$.

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**5,035,929**

**THREE DIMENSIONAL PICTURE**

**Mark Myers, Ft. Lauderdale, and Sandy Levy, Miami, both of Fla., assignors to Dimensional Images, Inc., Boca Raton, Fla.**

**Filed Jun. 13, 1989, Ser. No. 365,316**

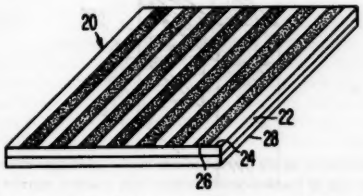
**Int. Cl.[5] B32B *3/30, 7/00***

**U.S. Cl. 428—30** **14 Claims**

1. A three dimensional, composite picture comprising:

a picture enlarged to a first enlargement size, said picture being formed by a lenticular process prior to enlargement;

a transparent substrate having, on a top surface thereof, periodically spaced non-transparent lines of a predetermined width that are enlarged to said first enlargement size;




said enlarged picture being fixed to a bottom surface of said transparent substrate as an underlying picture.

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5,035,930

## BIODEGRADABLE SHAPED PRODUCTS AND THE METHOD OF PREPARATION THEREOF

Norman L. Lacourse, and Paul A. Altieri, both of Plainsboro, N.J., assignors to National Starch and Chemical Investment Holding Corporation, Wilmington, Del.

Continuation of Ser. No. 353,352, May 17, 1989, abandoned, which is a continuation-in-part of Ser. No. 292,089, Dec. 30, 1988, Pat. No. 4,863,655. This application Feb. 9, 1990, Ser. No. 477,374

Int. Cl.[5] B29C *67/22;* C08J *9/12*

U.S. Cl. 428—35.6 31 Claims

1. A biodegradable shaped product comprising an expanded, low density, closed cell, resilient and compressible starch product, said starch having at least 45% by weight amylose content and the expanded product having a bulk density of from about 0.1 to 5 lb/ft$^3$, a resiliency of at least about 20%, and a compressibility of from about 100 to 800 g/cm$^2$.

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5,035,931

## MULTI-LAYER PARISON, MULTI-LAYER BOTTLE AND APPARATUS FOR AND METHOD OF MANUFACTURING PARISON AND BOTTLE

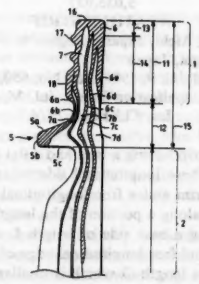
Tsutoo Yamada; Kenichi Morizumi; Yuji Kamegai; Yasushi Kanno, and Takemi Shibuya, all of Shinjuku, Japan, assignors to Dai Nippon Insatsu K.K., Tokyo, Japan

Filed Sep. 12, 1989, Ser. No. 406,390

Claims priority, application Japan, Sep. 12, 1988, 63-227754; Apr. 24, 1989, 1-104223; Jun. 26, 1989, 1-163261

Int. Cl.[5] B65D *1/02*

U.S. Cl. 428—35.7 9 Claims



1. A parison for manufacturing a bottle made of polyester resin and heat resistant resin, which comprises:

(a) a mouth portion with an opening, which has a multilayer structure including at least two layers of heat resistant resin and at least two polyester resin layers alternately disposed with respect to the heat resistant resin layers, said heat resistant resin being formed of a mixture of polyallylate with polyethylene terephthalate, the outer periphery and an opening end of the mouth portion being formed of one of said heat resistant resin layers;

(b) a shoulder portion connected to the mouth portion;

(c) a support ring provided at a portion of the mouth portion near said shoulder portion and projecting outwardly therefrom, the heat resistant resin layer at the outer periphery of the mouth portion extending from the opening end of the mouth portion to the support ring;

(d) a body portion; and

(e) a bottom portion.

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5,035,932

## GOLD COLORED POLYOLEFIN CONTAINERS

James B. Snell, and Marjorie B. Skinner, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 282,233, Dec. 9, 1988, Pat. No. 4,946,641, which is a division of Ser. No. 124,804, Nov. 24, 1987, Pat. No. 4,840,997. This application Mar. 5, 1990, Ser. No. 488,542

Int. Cl.[5] B65D *1/00;* C08L *23/02*

U.S. Cl. 428—36.4 17 Claims

1. A polyolefin container having a glossy, metallic gold color, made from the composition comprising:

(a) from about 95 to about 98 weight percent olefin polymer, wherein said polymer has a density of greater than or equal to about 0.94 g/cc;

(b) from about 0.5 to about 4 weight percent mica-based gold pigment;

(c) from about 0.01 to about 0.4 weight percent of mica-based bronze pigment; and

(d) from about 0.001 to about 0.006 weight percent carbon black.

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5,035,933

## PLASTIC ARTICLES WITH COMPATIBILIZED BARRIER RESIN

Casmir S. Ilenda, Hulmeville, Pa.; Thomas M. Frantz, Claymont, Del., and William T. Freed, Stockton, N.J., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 315,501, Mar. 1, 1989, Pat. No. 4,957,974. This application Sep. 28, 1989, Ser. No. 413,943

Int. Cl.[5] B65D *25/00;* B32B *27/08*

U.S. Cl. 428—36.6 11 Claims

1. A molded or extruded multi-layer plastic article with low permeability to gases, comprising:

(a) a melt-processible polyolefin layer;

(b) a gas barrier resin layer; and

(c) a polyolefin-acrylic graft copolymer compatibilizer layer disposed between the barrier resin layer and polyolefin layer, said polyolefin-acrylic graft copolymer comprising:

(1) a non-polar polyolefin trunk selected from the group consisting of polyethylene, polypropylene, polybutylene, poly(4-methylpentene), copolymers of said olefins with each other, and one or more copolymers of said olefins with minor amount of 1-alkenes, vinyl esters, vinyl chloride, (meth)acrylic ester, and (meth)acrylic acid, said trunk having a Mw of between about 50,000 and 1,000,000; and

(2) at least one methacrylate chain grafted with a covalent bond to said trunk having a weight ratio with said trunk of from about 1:9 to 4:1, said chain being a polymer derived from at least about 80% of a monomer of a methacrylic ester of the formula $CH_2{=}C(CH_3)COOR$, where R is alkyl, aryl, substituted alkyl, substituted aryl, or substituted alkaryl, and less than about 20% of an acrylic or styrenic monomer copolymerizable with the

methacrylic ester, said chain having a Mw of from about 20,000 to 200,000.

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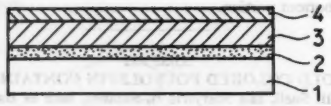
5,035,934

## ADHESIVE SHEET FOR PREVENTING ICING

Takeshi Tomiyama, Hiratsuka; Sadaaki Hashimoto, Chofu, and Heihachi Murase, Kanagawa, all of Japan, assignors to Kansai Paint Company, Limited, Hyogo, Japan

Filed Nov. 15, 1989, Ser. No. 436,997
Claims priority, application Japan, Nov. 26, 1988, 299300
Int. Cl.[5] B32B 7/06, 7/12; C09K 3/18
U.S. Cl. 428—40 12 Claims

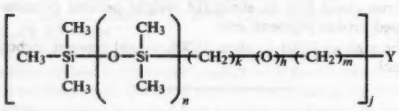



1. An adhesive sheet for preventing icing, the sheet being characterized in that the sheet comprises a release sheet (1), a pressure-sensitive adhesive layer (2) formed on the sheet (1), a base sheet (3) adhered to the layer (2) and an anti-icing layer (4) formed on the base sheet (3) and that the anti-icing layer (4) is formed from a composition (A) or a composition (B),

the composition (A) consisting essentially of:

(a) a copolymer having hydroxyl, or hydroxyl and other reactive group and comprising as essential monomer components a fluoroolefin and a vinyl monomer having hydroxyl and copolymerizable with the fluoroolefin,

(b) a silicone compound represented by the formula




wherein n is an integer of 6 to 300, k is an integer of 0 to 6, h is 0 or 1, m is an integer of 0 to 6, j is 1 or 2, and Y is hydroxyl, carboxyl, epoxy, or a monovalent or bivalent group containing one or two free isocyanate groups, and

(c) a polyisocyanate compound, and the composition (B) consisting essentially of:

(d) a graft copolymer prepared by reacting the component (a) and the component (b), and

(c) the polyisocyanate compound.

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5,035,935

## OVERWRAP INSERT

David A. Thomas, Beverly; Robert M. O'Connell, Belle Mead; Robert C. Reinert, Mount Laurel, all of N.J., and John M. Gillin, Huntington Valley, Pa., assignors to Philip Morris Incorporated, New York, N.Y.

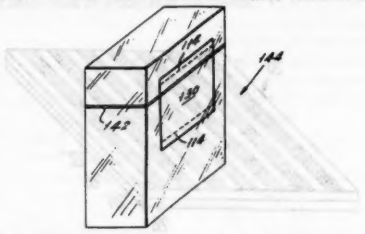
Filed Jan. 19, 1989, Ser. No. 299,053
Int. Cl.[5] B65D 75/54, 75/62
U.S. Cl. 428—43 4 Claims

1. An overwrap web provided with inserts, comprising:

an overwrap, said overwrap having a length and a width;

a plurality of inserts, said inserts being substantially evenly spaced along said overwrap, each of said inserts having a width which is less than the width of said overwrap; and

an overlaminate piece disposed over and covering each of said inserts, said overlaminate piece having a width which is greater than the width of said insert, said insert and said overlaminate piece being cut to the same length, said insert being sandwiched between said overlaminate piece and said overwrap, a first portion of said overlaminate piece being releasably bonded on its underside to said insert, a second portion of said overlaminate piece being releasably bonded on its underside to said overwrap;




whereby said overwrap web provided with inserts covered by said overlaminate pieces can be used to wrap a plurality of package with said covered inserts being appropriately positioned with respect to said packages.

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5,035,936

## LOOSE FILL INSULATION PRODUCT COMPRISING MINERAL WOOL NODULES

Mark B. Dockrill, Clearwater; John Buckham, Byron, and Anthony P. Shen, Sarnia, all of Canada, assignors to Fiberglas Canada Inc., Point Edward, Canada

Division of Ser. No. 307,495, Feb. 8, 1989. This application Jul. 10, 1990, Ser. No. 551,241
Int. Cl.[5] E04B 1/62; F16L 59/00, 59/04
U.S. Cl. 428—96 4 Claims

1. A loose fill insulation product comprising mineral wool nodules and produced by a process comprising the steps of:

spraying a lubrication-cooling agent onto a flow of discrete mineral wool fibers;

pneumatically conveying the sprayed fibers at a controlled rate into a nodulizing means, said rate being controlled by conveying the sprayed fibers through at least a first degassification elbow;

cutting and tumbling the fibers into nodules in the nodulizing means by contact with a plurality of blades rotating at a controlled speed and by rubbing upon each other as the fibers travel radially, circumferentially and axially through said nodulizing means; and

pneumatically conveying the nodules from said nodulizing means,

said nodules having a thermal performance of at least 18.5 RSI/m at a density of 12.8 kg/m$^3$ and a particle size having a projected means area of less than 12 mm$^2$, with a corresponding standard deviation of less than 11 mm$^2$.

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5,035,937

## WEATHER STRIP

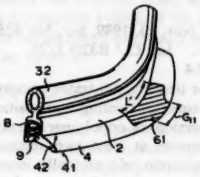
Masahiro Nozaki, Aichi, Japan, assignor to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Filed Jul. 9, 1990, Ser. No. 550,169
Claims priority, application Japan, Jul. 26, 1989, 1-086833
Int. Cl.[5] E06B 7/16
U.S. Cl. 428—122 4 Claims

1. A weather strip having a trim and a flat type seal lip, said seal lip having a base longitudinal side where said seal lip is coupled to said trim and a free longitudinal edge, wherein a cutout is defined along a portion of the length of said seal lip, said cutout having a base side of length L and an edge side coinciding with said free longitudinal edge of said seal lip, said edge side having a length G which is smaller than said length L, even when said trim is bent as a corner, and a corner seal lip molded in said cutout so as to be integral with said seal lip,

wherein said corner seal lip is molded from a material having

a hardness less than a material from which said seal lip is molded, and




wherein said trim is bent into a curved shape so as to define a corner portion, said cutout being defined at said corner portion.

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**5,035,938**

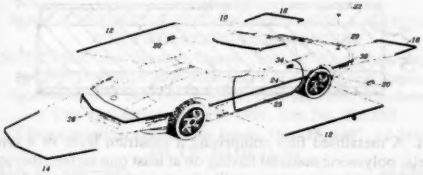
**TRIM STRIP PROTECTOR**

**Brett B. Truett, 1902 Briar Ave., Utica, N.Y. 13501**

**Filed Mar. 19, 1990, Ser. No. 495,703**

**Int. Cl.[5] B60R *13/00***

**U.S. Cl. 428—122** **7 Claims**



1. A kit of protecting covering members for enclosing decorative textures trim strips on an automobile when waxing the finish to prevent unwanted wax material residue from building up on the trim strips which comprises in combination:

a first pair of elongated reusable plastic channels having a generally U-shaped cross section;

said first pair being adapted to extend substantially from the front wheel to the rear wheel well along a side of an automobile;

a second pair of reusable plastic channels having a generally U-shaped cross section, each having a central portion and a leg member extending from each end of said central portion at substantially right angles thereto;

said second pair of reusable channels being adapted to extend substantially around the front and rear ends of an automobile to protect decorative trim strips located between corresponding front and rear wheel wells;

at least one pair of door handle reusable plastic cover members for protecting decorative trim portions of an automobile door handle; and

at least one selected auxiliary reusable cover member adapted to cover a decorative trim member on an automobile so that an automobile owner may apply the reusable plastic channels and cover members to an automobile whenever waxing the automobile finish, to prevent unwanted application of wax to the trim strips.

**5,035,939**

**MANUFACTURE OF PRINTED CIRCUIT BOARDS**

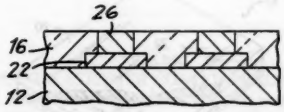
**Edward J. Conlon, Princeton; Ashok N. Prabhu, East Windsor, both of N.J.; Simon M. Boardman, Holland, Pa., and Valerie A. Pendrick, Lambertville, N.J., assignors to David Sarnoff Research Center, Inc., Princeton, N.J.**

**Filed Feb. 9, 1990, Ser. No. 477,393**

**Claims priority, application United Kingdom, Aug. 31, 1989, 8919710; Aug. 31, 1989, 8919711; Sep. 21, 1989, 8921385**

**Int. Cl.[5] B32B *3/00***

**U.S. Cl. 428—137** **17 Claims**




1. A substrate having a first patterned photoresist layer thereon, a dielectric layer thereof, and a patterned photoresist layer having openings over and aligned with said first patterned photoresist layer.

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**5,035,940**

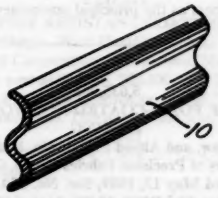
**ALUMINUM-FLUOROPOLYMER LAMINATE**

**Robert A. Winton, Pineville, and Eugene F. Christie, Charlotte, both of N.C., assignors to Rexham Corporation, New York, N.Y.**

**Filed Sep. 19, 1988, Ser. No. 246,674**

**Int. Cl.[5] B32B *1/00, 1/10, 15/08***

**U.S. Cl. 428—174** **27 Claims**




1. A contoured article such as an automotive trim piece having a metal surface appearance that is resistant to weathering, and comprising:

a metal sheet having a contoured, nonplanar configuration;

a weather resistant protective transparent surfacing film formed of a vinylidene fluoride-containing polymer overlying and coextensive with one surface of said metal sheet;

a transparent adhesive disposed between and bonding said protective film to said metal sheet, said transparent adhesive being formed of an acrylic resin adhesive na a zircoaluminate adhesion promoter; and

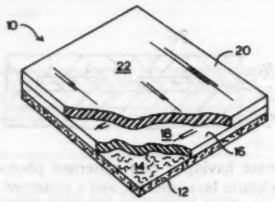
a polymer backing bonded to the other surface of said metal sheet and serving to reinforce and maintain the shape of the contoured metal sheet.

5,035,941

## ANTI-STATIC MULTILAYER LAMINATE COMPRISING A NON-WOVEN LAYER EXTRUSION COATED WITH POLYMERIC LAMINAE, AND METHOD OF MAKING THE SAME

William A. Blackburn, Madison, Ala., assignor to Abandasco, Inc., Manhasset, N.Y.

Filed Aug. 22, 1989, Ser. No. 396,855
Int. Cl.[5] A62B *17/00*; B32B *27/08, 27/18, 31/30, 33/00*
U.S. Cl. 428—286 20 Claims




1. A multilayer laminate, comprising:
(a) a substrate layer of non-woven material;
(b) an intermediate layer of polymeric material which is free of anti-static material and which is extrusion laminated to the substrate layer; and
(c) an outer layer of polyethylene which contains an anti-static material and comprises low density polyethylene and linear low density polyethylene, and which is co-extruded with and extrusion laminated to the intermediate layer of polymeric material.

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5,035,942

## FLEXIBLE MATERIALS FOR REFLECTING ELECTROMAGNETIC WAVE

Yoshikazu Nagata, and Yoshiyuki Nishimura, both of Kamisumachi, Japan, assignors to Petoca Ltd., Tokyo, Japan

Filed Feb. 23, 1989, Ser. No. 313,822
Claims priority, application Japan, Feb. 26, 1988, 63-419765
Int. Cl.[5] B32B *11/00*; D04K *3/08*; H05K *9/00*
U.S. Cl. 428—288 2 Claims

1. Flexible materials for reflecting electromagnetic waves comprising non-woven fabric formed by self adhesion of pitch based carbon fibers as the principal component.

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5,035,943

## BREATHABLE FOAM-COATED NONWOVEN PILLOW TICKING

William S. Kinlaw, and Alfred F. Baldwin, both of Greensboro, N.C., assignors to Precision Fabrics Group, Greensboro, N.C.

Filed May 12, 1989, Ser. No. 350,875
Int. Cl.[5] B32B *27/00, 5/18, 5/22*
U.S. Cl. 428—290 12 Claims

1. A wipeable, water repellent, lightweight, bacteriostatic foam-coated nonwoven ticking fabric composed of a nonwoven substrate coated with a continuous network of an open cell foam distributed on and covering one surface of and penetrating substantially into the center of the nonwoven substrate with the other surface of the nonwoven substantially devoid of foam, the resultant foam-coated fabric also treated with an antimicrobial agent to impart or enhance bacteriostatic properties, the fabric having a spray rating (INDA 80.1–70) from 70–100, a Frazier air permeability (INDA 70.1–70) between 60 to 200 $ft^3/min/ft^2$, a Suter hydrostatic head (INDA 80.6–70) of at least 12 centimeters and an oil-repellency (INDA 80.8–70) of at least 3.

5,035,944

## METHOD FOR TREATING SUBSTRATES

Mark S. Frazza, Philadelphia, and Linda S. Smith, Oreland, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Nov. 13, 1989, Ser. No. 435,850
Int. Cl.[5] B32B *3/26*
U.S. Cl. 428—312.4 6 Claims

1. A method for treating substrates comprising:
(a) forming an aqueous treating composition comprising an aqueous dispersion of copolymer particles wherein said particles comprise at least two mutually incompatible copolymers wherein said mutually incompatible copolymers comprise an outer phase copolymer with a glass transition temperature (Tg) lower than about 35° C. and an inner phase copolymer with a Tg higher than about 45° C., and wherein said particles have an average particle size from about 20 to about 70 nanometers; and
(b) applying said composition onto a substrate.

5. The method of claim 1 wherein said substrate is a porous substrate selected from the group consisting of cellulosic substrates and cementitious substrates.

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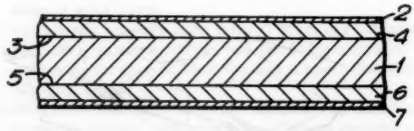
5,035,945

## POLYMERIC FILMS

Charles R. Hart, Yarm, England, assignor to Imperial Chemical Industries plc, London, England

Filed Jul. 20, 1989, Ser. No. 382,289
Claims priority, application United Kingdom, Jul. 25, 1988, 8817663
Int. Cl.[5] B32B *5/16, 15/08*
U.S. Cl. 428—323 8 Claims




1. A metallised film comprising a substrate layer of a synthetic polymeric material having on at least one surface thereof an adherent layer and a metallic layer on the surface of the at least one adherent layer remote from the substrate, characterised in that the adherent layer comprises an acrylic or methacrylic copolymer, the copolymer comprising
(a) a comonomer selected from acrylic acid, methacrylic acid or a derivative of acrylic acid or methacrylic acid,
(b) a copolymerisable sulphonated ethylenically unsaturated comonomer, and optionally
(c) an additional comonomer, said comonomers (a) and (b) being present in the respective molar percentages in the ranges (a) 26 to 99% and (b) 1 to 50%.

2. A metallised film as claimed in claim 1, wherein comonomer (a) comprises, based on the copolymer, a mixture of an alkyl acrylate and an alkyl methacrylate in a total molar proportion in the range 55 to 80 mole %.

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5,035,946

## OVERPRINT AQUEOUS VARNISH

Timothy J. Baker, Claremore, and John H. Woods, Tulsa, both of Okla.

Division of Ser. No. 422,890, Nov. 28, 1989, which is a continuation-in-part of Ser. No. 267,064, Nov. 4, 1988, Pat. No. 4,908,063. This application Nov. 21, 1990, Ser. No. 616,475
Int. Cl.[5] B32B *5/16*
U.S. Cl. 428—327 12 Claims

7. A method of coating a paper product comprising the steps of forming an aqueous mixture of

a. a finely divided unoxidized polyethylene having a molecular weight of about 700 to about 3,000;
b. a finely divided oxidized polyethylene having a molecular weight of about 700 to about 3,000; and wherein components a and b comprise 1–60% of the mixture and,
c. 2–40% of an oxyalkylated essentially linear alcohol represented by the formula

$$CH_3(CH_2)_x O—(CH_2CH_2O)_n H$$

wherein x is about 8 to about 70 and n is about 2 to about 65 and balance water; adding the thus-formed aqueous mixture to an overprint aqueous varnish; mixing the aqueous mixture and varnish; and applying the resulting mixture to a paper product bearing printing ink indicia.

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**5,035,947**

## MAGNETIC RECORDING MEDIUM INCLUDING MAGNETIC METALLIC POWDER

**Seigi Kawarai, Hyogo; Sadamu Kuse, Osaka, and Yasushi Orita, Kyoto, all of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan**

**Filed Jan. 19, 1989, Ser. No. 299,020**
**Claims priority, application Japan, Jan. 22, 1988, 63-12850**
**Int. Cl.[5] G11B *23/00***
**U.S. Cl. 428—329** **10 Claims**

1. A magnetic metallic powder consisting essentially of metal iron, at least 0.1% by weight of manganese based on the weight of said metal iron and at least one alkaline earth metal in an amount of from 1 to 50 times the weight of said manganese.

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**5,035,948**

## MAGNETIC RECORDING MEDIUM AND A METHOD FOR PREPARING THE MEDIUM

**Shinji Saito, and Hiroshi Ogawa, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Continuation of Ser. No. 259,367, Oct. 18, 1988, abandoned. This application Aug. 31, 1990, Ser. No. 576,103**
**Claims priority, application Japan, Oct. 19, 1987, 62-264726**
**Int. Cl.[5] G11B *23/00***
**U.S. Cl. 428—329** **14 Claims**

1. A magnetic recording medium comprising a non-magnetic support having thereon an under magnetic layer and an upper magnetic layer in that order, each comprising ferromagnetic particles and binders, wherein the thickness of said upper magnetic layer is less than 0.5 μm and abrasive agents, which have a Mohs' hardness of 6 or more and have an average particle diameter of 0.5 μm or less, are contained in said upper magnetic layer wherein said ferromagnetic particles contained in the under magnetic layer and the upper magnetic layer are acicular ferromagnetic particles having an acicular ratio (long axis/short axis) of from 3 to 20 and wherein said ferromagnetic particles are metal oxide ferromagnetic particles or ferromagnetic metal particles.

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**5,035,949**

## HIGH-TEMPERATURE, HIGH-EMISSIVITY, OPTICALLY BLACK BORON SURFACE

**Donald F. Shepard, Evergreen; Robert J. Fenolia, Broomfield, both of Colo.; Dennis C. Nagle, Ellicott City, and Michael E. Marousek, Baltimore, both of Md., assignors to Martin Marietta Corporation, Denver, Colo.**

**Filed Dec. 5, 1988, Ser. No. 280,146**
**Int. Cl.[5] B32B *9/04***
**U.S. Cl. 428—337** **22 Claims**

1. An article of manufacture which comprises a substrate and a boron coating adhered to said substrate, said boron coating being optically black and having an absorptivity of more than about 0.89 and an emissivity more than about 0.86, said boron coating being obtained by plasma spraying onto said substrate a boron powder selected from the group consisting of crystalline boron having a particle size of about −200 mesh and amorphous boron under conditions effective to obtain adhesion of said coating to said substrate and to obtain said absorptivity and emissivity.

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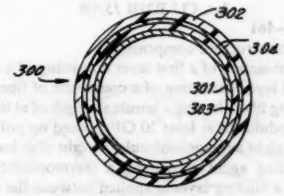
**5,035,950**

## FLUOROELASTOMER COATED FUSER ROLL

**Chris Del Rosario, Demarest, N.J., assignor to Ames Rubber Corporation, Hamburg, N.J.**

**Filed Feb. 9, 1990, Ser. No. 478,074**
**Int. Cl.[5] B32B *27/08, 15/08***
**U.S. Cl. 428—421** **15 Claims**




1. A fuser member to fix toner particles on a recording medium, comprising:
a substrate; and
a top coat on the substrate, the top coat of a fluoroelastomer including vinylidene fluoride and at least about 23.4 mole percent hexafluoropropylene.

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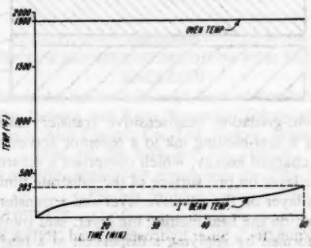
**5,035,951**

## FIRE RESISTANT COATINGS

**Felix A. Dimanshteyn, West Hartford, Conn., assignor to Firestop Chemical Corporation, Georgetown, Mass.**

**Continuation-in-part of Ser. No. 260,400, Oct. 20, 1988, Pat. No. 4,871,477, which is a continuation-in-part of Ser. No. 230,054, Aug. 9, 1988, abandoned. This application Aug. 2, 1989, Ser. No. 389,313**
**Int. Cl.[5] B32B *13/04*; C09K *21/02*; C09D *5/18***
**U.S. Cl. 428—446** **8 Claims**




1. A fire-protected material comprising a member having affixed to a surface thereto a coating consisting of a mixture of:

(a) a water soluble alkali metal silicate;
(b) at least one inorganic particulate material which, when exposed to a selected flame temperature, endothermically releases a nonflammable gas; and
(c) kaolin, said kaolin serving to improve the thermal resistance of said coating;
whereby said coating protects said member against fire temperatures by presenting an intumescent thermal barrier which substantially insulates said member from said flame temperatures, and is capable of forming a vitreous surface barrier when exposed to flame.

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5,035,952

## BALLISTIC STRUCTURE

Peter Bruinink, Maastricht, and Wilhelmus A. R. M. Pessers, Liempde, both of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands

Filed May 5, 1989, Ser. No. 347,686
Claims priority, application Netherlands, May 6, 1988, 8801195
Int. Cl.[5] B32B *15/08*
U.S. Cl. 428—461 5 Claims

1. A ballistic structure comprising:
a solid combination of a first layer consisting of a metal and a second layer consisting of a composite of fiber material containing fibers having a tensile strength of at least 2 GPa and a modulus of at least 20 GPa, based on polyethylene with a weight average molecular weight of at least $4 * 10^5$;
and a binding agent containing a thermoplastic polymer wherein a binding layer is applied between the first layer and the second layer, said binding layer containing a graft copolymer of polyethylene and at least one unsaturated fused ring carboxylic acid anhydride and a copolymer of ethylene and an ethylenically unsaturated ester or an α-olefin.

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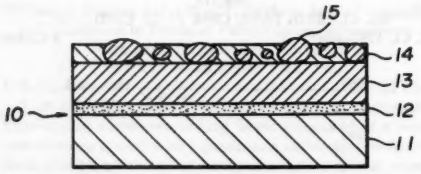
5,035,953

## PROCESS FOR THERMAL TRANSFER RECORDING AND HEAT-SENSITIVE TRANSFER MATERIAL

Nobumori Kanno; Kunio Ishii; Neiji Takeda, and Hiroyuki Nihashi, all of Tokyo, Japan, assignors to Toyo Ink Manufacturing Co., Ltd., Tokyo, Japan

Filed Jun. 23, 1989, Ser. No. 370,880
Claims priority, application Japan, Jun. 28, 1988, 63-160459
Int. Cl.[5] B41M *5/26*
U.S. Cl. 428—484 7 Claims




2. A multi-gradation heat-sensitive transfer material for transferring a heat-melting ink to a receptor according to an amount of charged energy, which comprises a substrate film, an adhesive layer on one surface of the substrate film, a heat-melting ink layer on the adhesive layer and a transfer control layer formed on the heat-melting ink layer, said transfer control layer formed by applying a dispersion of a heat-melting resin, a wax or a heat-melting ink in a heat-resistant resin onto the heat-melting ink layer.

5,035,954

## HEAT-SENSITIVE RECORD MATERIAL AND METHOD FOR PRODUCING IT

Naoki Yonese, Nishinomiya; Mikio Nakamura, Kobe; Masato Kawamura, Amagasaki, and Yukio Takayama, Toyonaka, all of Japan, assignors to Kanzaki Paper Manufacturing Co., Ltd., Tokyo, Japan

Filed Aug. 22, 1989, Ser. No. 397,006
Claims priority, application Japan, Sep. 5, 1988, 63-222158
Int. Cl.[5] B41M *5/26*
U.S. Cl. 428—500 11 Claims

1. A heat-sensitive record material having a heat-sensitive recording layer on a base sheet, in which a middle layer mainly comprising a binder and at least one pigment having an oil absorption of at least 80 cc/100 g measured by JIS K 5101 is formed between the heat-sensitive recording layer and the base sheet, characterized in that the middle layer comprises an acrylic thickener in an amount of 0.05 to 5 parts by weight per 100 parts by weight of the pigment on a dry basis.

7. A method for producing a heat-sensitive record material, characterized in blade-coating on a base sheet a coating composition which mainly comprises at least one pigment having an oil absorption of at least 80 cc/100 g measured by JIS K 5101 and a binder, the coating composition comprising an acrylic thickener in an amount of 0.05 to 5 parts by weight per 100 parts by weight of the pigment on a dry basis, and forming a recording layer on the middle layer.

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5,035,955

## HEAT-SHRINKABLE LAMINATED FILM

Yoshihiro Matsukura, Niihari; Nobuyuki Hisazumi, and Kunio Shibuya, both of Tsuchiura, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 6, 1988, Ser. No. 299,012
Claims priority, application Japan, Dec. 29, 1987, 62-333978; Dec. 29, 1987, 62-333979; Nov. 2, 1988, 63-278129
Int. Cl.[5] B32B *27/00*
U.S. Cl. 428—520 12 Claims

1. A biaxially oriented heat-shrinkable laminated film exhibiting a heat shrinkage percentage of 15% or more at 90° C. and excellent gas barrier properties, and having a layer of vinylidene chloride copolymer composition containing 0.5 to 9.1% by weight of a polyfunctional acrylate or methacrylate, said vinylidene chloride copolymer being crosslinked by applying electron beams to said laminate at a dosage of 1 to 10 megarads.

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5,035,956

## LUMBER PRODUCT PROTECTED BY AN ANTI-FUNGAL COMPOSITION

Frederick S. Sedun, Brentwood Bay, Canada, assignor to Safer, Inc., Newton, Mass.

Filed Aug. 9, 1989, Ser. No. 391,416
Int. Cl.[5] B32B *21/04*
U.S. Cl. 428—537.1 6 Claims

1. A lumber product resistant to growth of sapstain fungi and mold, said lumber product comprising:
unseasoned, cut wood having on a surface thereof an anti-fungal composition consisting essentially of a fungicidally effective concentration ranging from about 0.5% to 10% by weight of an alkyl sulfosuccinate salt compound, as an active ingredient, in which the alkyl groups of the alkyl sulfosuccinate salt compound have between 5 and 22 carbon atoms, and an oil component.

5,035,957

## COATED METAL PRODUCT AND PRECURSOR FOR FORMING SAME

Robert W. Bartlett, Tucson, Ariz.; Paul J. Jorgensen, Cupertino, Calif.; Ibrahim M. Allam, Dhahran, Saudi Arabia, and David J. Rowcliffe, Stockholm, Sweden, assignors to SRI International, Menlo Park, Calif.

Division of Ser. No. 111,210, Oct. 21, 1987, Pat. No. 4,935,073, which is a continuation-in-part of Ser. No. 325,504, Nov. 27, 1981, Pat. No. 4,483,720, said Ser. No. 662,253, said Ser. No. 662,252. This application Feb. 23, 1990, Ser. No. 483,935

Int. Cl.[5] B22F *3/00*

U.S. Cl. 428—552 16 Claims

1. A coated metal article comprising:

(a) a metal substrate and

(b) a coating on at least one surface of the metal substrate, such coating being a homogeneous alloy of (1) a metal $M_1$ which is at least one of the metals selected from the group consisting of zirconium and titanium and (2) at least one metal $M_2$ which forms no compound with an element X or which forms a compound with X which is less thermodynamically stable than a compound of $M_1$ and X, X being selected from the group consisting of oxygen, nitrogen, carbon, boron and silicon, $M_1$ being present in the alloy in an amount not less than 50% of th weight of the alloy, $M_2$ being present in substantial amount sufficient to bond the coating firmly to the substrate,

said alloy coating being dense, non-porous, strongly adherent to the substrate metal and having a substantially isotropic microstructure.

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5,035,958

## NICKEL-BASE SUPERALLOYS ESPECIALLY USEFUL AS COMPATIBLE PROTECTIVE ENVIRONMENTAL COATINGS FOR ADVANCED SUPERALOYS

Melvin R. Jackson, Schenectady, N.Y.; Mark L. Prugar, Mason, Ohio; Swe-Wong Yang, Clifton Park, N.Y.; John R. Rairden, III, Schenectady, and Michael F. X. Gigliotti, Jr., Scotia, both of N.Y., assignors to General Electric Company, Cincinnati, Ohio

Continuation of Ser. No. 314,233, Feb. 21, 1989, abandoned, which is a continuation of Ser. No. 195,444, May 12, 1988, abandoned, which is a continuation of Ser. No. 59,179, Jun. 12, 1987, abandoned, which is a continuation of Ser. No. 890,966, Jul. 29, 1986, abandoned, which is a continuation of Ser. No. 768,929, Aug. 26, 1985, abandoned, which is a continuation of Ser. No. 565,802, Dec. 27, 1983, abandoned. This application Oct. 11, 1989, Ser. No. 420,708

Int. Cl.[5] B22F *7/04*

U.S. Cl. 428—553 18 Claims

1. A composition for application to nickel-base superalloy substrates consisting essentially of, by weight, 1 to 10% cobalt, 6 to 12% chromium, 5 to 8% aluminum, 1 to 10% tantalum, 1 to 10% tungsten, 0 to 3% rhenium, 0 to 2% molybdenum, 0.1 to 2% hafnium, 0.005 to 0.1% boron, 0.005 to 0.25% carbon, the balance nickel and incidental impurities.

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5,035,959

## STEEL BODY HAVING CERAMIC TIP SOLDERED THERETO

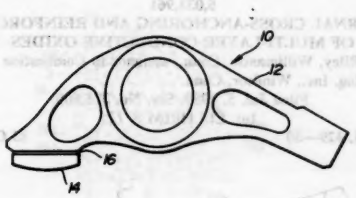
Masaya Ito, and Masato Taniguchi, both of Nagoya City, Japan, assignors to NGK Spark Plub Co., Ltd., Nagoya City, Japan

Continuation of Ser. No. 183,157, Apr. 19, 1988, abandoned. This application Dec. 18, 1989, Ser. No. 449,061

Claims priority, application Japan, Apr. 20, 1987, 62-95235

Int. Cl.[5] F01L *1/18*

U.S. Cl. 428—627 10 Claims




1. A rocker arm for use in an internal combustion engine, comprising:

a base body fabricated of a Ni-Cr-Mo steel comprising about 0.3 to 1.5 wt % Mn, about 1 to 5 wt % Ni, less than about 8 wt % Cr, less than about 1.5 wt % Mo, about 1 wt % Si, less than about 1 wt % W, less than about 1 wt % V, not less than about 0.04 wt % C and a trace of S and P an unavoidable impurities;

a silicon nitride base ceramic tip;

a buffer plate selected from a group consisting of a copper plate and a nickel plate, said buffer plate being interposed between said ceramic tip and a portion of said base body; and

a solder bonding said ceramic tip to said portion of said base body with said buffer plate interposed therebetween, said solder being selected from a group consisting of a Ag-Cu solder, a Ti-Cu solder and a Ti-Ag-Cu solder.

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5,035,960

## MAGNETIC RECORDING MEDIUM FOR MAGNETIC ENCODER

Tomoo Kamigaki; Ichiro Tokunaga, both of Furukawa; Satoshi Yanagita, Isehara, and Koro Hayasaka, Tokyo, all of Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Filed Jul. 14, 1988, Ser. No. 219,026

Claims priority, application Japan, Jul. 24, 1987, 62-184913

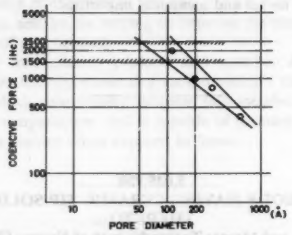
Int. Cl.[5] G11B *23/00*

U.S. Cl. 428—694 5 Claims

1. A magnetic recording medium for a magnetic encoder comprising:

an alumite magnetic film having pores, each of said pores having a diameter in the range of about 80 to 200 Ang-

stroms and a depth in the range of about 10 to 100 microns; and




precipitated magnetic metal contained in said pores in an amount of 0.5 mg or more per/cm2, said magnetic metal being selected from the group consisting of iron, cobalt nickel, and their alloys.

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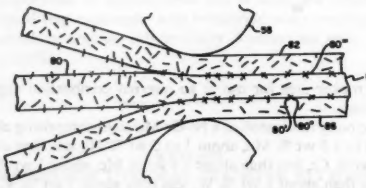
**5,035,961**

**INTERNAL CROSS-ANCHORING AND REINFORCING OF MULTI-LAYER CONDUCTIVE OXIDES**

**Brian Riley, Willimantic, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.**

**Filed Jul. 5, 1989, Ser. No. 375,609**
**Int. Cl.[5] H01M *8/12***
**U.S. Cl. 429—30** **23 Claims**



1. In a solid oxide fuel cell including a triplex sheet having laminar layers of fuel electrode, electrolyte, and air electrode, the sheet being sandwiched between support layers, the improvement comprising:

at least two of said layers having inorganic whiskers projecting from the surface of one layer and interengaged with the other layer, said interengagement serving to anchor said two layers together.

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**5,035,962**

**LAYERED METHOD OF ELECTRODE FOR SOLID OXIDE ELECTROCHEMICAL CELLS**

**Russell R. Jensen, Murrysville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Mar. 21, 1990, Ser. No. 496,706**
**Int. Cl.[5] H01M *8/12***
**U.S. Cl. 429—40** **4 Claims**

1. A fuel electrode comprising:

a) a first layer comprising substantially stabilized zirconia;

b) a second layer, in intimate contact with said first layer, comprising a mixture of stabilized zirconia and metal powder selected from the group consisting of nickel, palladium, platinum and cobalt; and

c) a third layer comprising substantially metal powder selected from the group consisting of nickel, palladium, platinum and cobalt.

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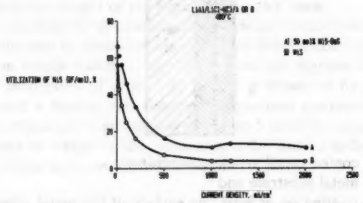
**5,035,963**

**HIGH TEMPERATURE RECHARGEABLE MOLTEN SALT BATTERY**

**Edward J. Plichta, Howell, and Wishvander Behl, Ocean, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Sep. 11, 1990, Ser. No. 580,689**
**Int. Cl.[5] H01M *4/58, 4/62***
**U.S. Cl. 429—103** **5 Claims**



1. A high temperature rechargeable molten salt battery including a transition metal-sulfide as the cathode, a lithium-aluminum alloy as the anode, a molten lithium salt as the electrolyte, and an alkaline earth metal sulfide as an additive to the transition metal sulfide cathode wherein the cathode mix is prepared by physically mixing the alkaline earth metal sulfide and the transition metal sulfide in the proper ratios.

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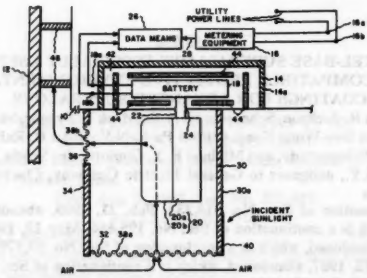
**5,035,964**

**PASSIVE COOLING DEVICE FOR EXTENDING BATTERY LIFE**

**Lionel M. Levinson; Dale M. Brown, and Roy F. Thornton, all of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Dec. 1, 1989, Ser. No. 444,338**
**Int. Cl.[5] H01M *10/50***
**U.S. Cl. 429—120** **20 Claims**




1. An electrical-energy-supplying device having an extended storage life, comprising:

battery means for supplying electrical energy;

a heat sink external to said battery means and spaced therefrom;

link means in the form of a solid metal connection between said battery means and said heat sink for transferring heat

energy by conduction from said battery means to said heat sink; and

chimney means exposed at least in part to incident sunlight for drawing air past said heat sink to dissipate heat therefrom in dependence on the intensity of said incident sunlight.

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**5,035,965**

## PRINTED CIRCUIT BOARD HAVING A THIN FILM CELL INCORPORATED THEREIN

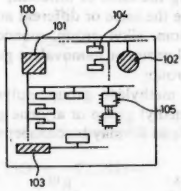
**Kazuo Sangyoji; Morimasa Mano, and Takeshi Miyabayashi, all of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan**

**Filed Apr. 19, 1990, Ser. No. 514,684**

**Claims priority, application Japan, May 1, 1989, 1-112641**

**Int. Cl.[5] H01M *6/40***

**U.S. Cl. 429—124** **5 Claims**




1. A printed circuit board having a thin film cell incorporated therein, comprising:

a substrate formed with a predetermined circuit pattern;

a flexible electrically-conductive negative-polarity material layer fixedly secured on said substrate;

an electrolytic material layer secured to said negative-polarity material layer;

a flexible electrically-conductive positive-polarity material layer secured to said electrolytic material;

an electric collector secured to said positive-polarity material layer; and

lead terminals electrically connected to said negative-polarity material layer.

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**5,035,966**

## SEALED LEAD-ACID BATTERY

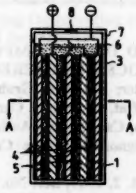
**Akio Tokunaga, and Toshiaki Hayashi, both of Kyoto, Japan, assignors to Japan Storage Battery Co., Ltd., Kyoto, Japan**

**Filed Dec. 8, 1989, Ser. No. 447,938**

**Claims priority, application Japan, Dec. 9, 1988, 63-312181; Dec. 9, 1988, 63-312182; Dec. 20, 1988, 63-321124**

**Int. Cl.[5] H01M *2/14***

**U.S. Cl. 429—130** **13 Claims**




1. In a sealed lead-acid battery comprising positive plates and negative plates housed in a container, the improvement comprising:

an element having a spacer bar of synthetic resin with a given thickness inserted between said positive plate and said negative plate, said spacer bar being shaped in the form of an E and having a plurality of arms containing vertical corrugations;

fine particles of hydrous silica dioxide placed in a gap between said positive and negative plates and around said element, said fine particles of hydrous silica dioxide having primary particles of a size of 10–40 millimicrons which agglomerate to form secondary or tertiary particles; and

a sulfuric acid electrolyte impregnated and retained in said loaded silica particles to perform discharging.

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**5,035,967**

## EMBOSSED TYPE SEPARATOR FOR A STORAGE BATTERY

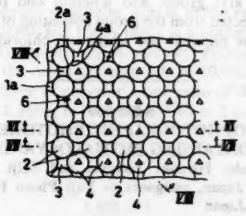
**Takao Hasegawa, 1892-1, Ikeda-cho, Ibi-gun, and Hideo Endo, 630, Tarui-cho, Fuwa-gun, both of Gifu-ken, Japan**

**Continuation of Ser. No. 654,041, Sep. 21, 1984, abandoned, and a continuation of Ser. No. 445,949, Dec. 1, 1982, abandoned. This application Nov. 14, 1988, Ser. No. 274,731**

**Claims priority, application Japan, Dec. 3, 1981, 56-193707**

**Int. Cl.[5] H07M *2/18***

**U.S. Cl. 429—147** **12 Claims**




1. An embossed type separator for a storage battery comprising a thin porous sheet provided, by embossing, on both side surfaces thereof a large number of spherical projections of equal height and diameter arranged at regular intervals in numerous vertical and horizontal rows and wherein the spherical projections on one side surface and those on the other side surface are shifted in position alternately with one another in the vertical and horizontal directions, thus forming on each side surface the same uniform concave and convex pattern so that the spherical projections projecting towards one side and spherical cavities defined by the respective rear surfaces of the spherical projections protruding toward the opposite side are uniformly arranged vertically and horizontally in their mutually alternately shifted positions and so that there are formed a large number of vertical and horizontal crossing lines configured to act as gas discharging groove passages each of which is composed of an alternately arranged and mutually communicating line of spherical cavities and valley spaces formed between every adjacent two of the spherical projections arranged in adjacent rows, said spherical cavities and projections having substantially the same diameter said spherical projections formed on each side surface of said separator being arranged in a large number of vertical and horizontal rows and the spherical cavities formed on said surfaces being arranged vertically and horizontally in their shifted position in relation to the spherical projections, and said projections and cavities being disposed so close to each other that there is left no flat area between the circumferential edge of the base of each of the spherical projections and that of the open base of each of the spherical cavities so that the circumferential base of each depression is in direct contact with the circumferential bases of its four neighboring projections without leaving any flat space therebetween, said cavities and projections forming the same pattern on both sides of said separator.

**5,035,968**

## ELECTROPHOTOGRAPHIC PHOTORECEPTOR WITH PHTHALOCYANINE IN STYRENEMALEIC ANHYDRIDE HALF-ESTER BINDER

**Seiji Horie, and Naonori Makino, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

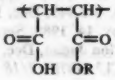
**Filed Aug. 9, 1989, Ser. No. 391,018**

**Claims priority, application Japan, Aug. 9, 1988, 63-198668**

**Int. Cl.[5] G03G** *5/087, 5/047*

**U.S. Cl. 430—58** **9 Claims**

1. An electrophotographic photoreceptor comprising an electrically conductive support having thereon at least a charge generating layer and a charge transporting layer, wherein said charge generating layer contains a phthalocyanine pigment and, as a resin binder, at least one copolymer which contains as recurring units at least styrene units and maleic anhydride half ester units represented by the following general formula (I):



(I)

wherein R is selected from the group consisting of an alkyl group or an aryl group, and wherein said phthalocyanine pigment is selected from the group consisting of ϵ-type copper phthalocyanine pigment and aluminum chloride phthalocyanine.

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**5,035,969**

## ELECTROPHOTOGRAPHIC PHOTORECEPTOR CONTAINING PHTHALOCYANINE

**Syunichi Kondo; Hiroaki Yokoya, and Seiji Horie, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

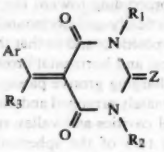
**Filed Feb. 8, 1990, Ser. No. 476,909**

**Claims priority, application Japan, Feb. 9, 1989, 1-30407; Mar. 3, 1989, 1-51566; Mar. 3, 1989, 1-51567**

**Int. Cl.[5] G03G** *5/06, 5/09*

**U.S. Cl. 430—83** **6 Claims**

1. An electrophotographic photoreceptor for copying machine or photoprinter comprising an electrically conductive support having thereon a photoconductive layer, wherein said photoconductive layer contains a phthalocyanine pigment and a compound represented by the general formula (I), (II), (III), (IV) or (VI):



(I)

wherein

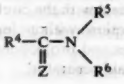
z represents a sulfur or oxygen atom;

Ar represents a monovalent aromatic hydrocarbon group or monovalent heterocyclic group;

$R_3$ represents a hydrogen atom, alkyl group, aryl group or aralkyl group;

Ar and $R_3$ may together form a ring; and

$R_1$ and $R_2$ may be the same or different and each represents an alkyl group, aryl group or aralkyl group;



(II)

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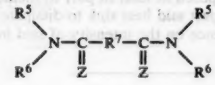
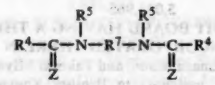


(III)



(IV)

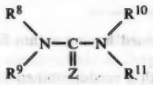
wherein Z represents a sulfur or oxygen atom;

$R_4$ represents an alkyl group, akloxy group, monovalent or bicyclic condensed aryl group, monocyclic or bicyclic condensed aryloxy group or monovalent group derived from heterocyclic group, the two R's in the general formula (IV) being the same or different;

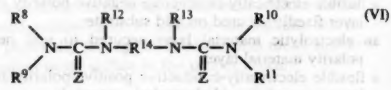
$R^5$ and $R^6$ may be the same or different and each represents a hydrogen atom, alkyl group, monocyclic or bicyclic condensed aryl group or monovalent group derived from heterocyclic group;

$R^7$ represents a methylene group, polymethylene group, branched alkanediyl group or arylene group; and

$R^4$ and $R^5$ or $R^5$ and $R^6$ may be connected to each other:



(V)



(VI)

wherein Z represents a sulfur or oxygen atom;

$R^8$, $R^9$, $R^{10}$, $R^{11}$, $R^{12}$ and $R^{13}$ may be the same or different and each represents a hydrogen atom, an alkyl group, aryl group or monovalent group derived from heterocyclic gruop, $R^8$ and $R^9$ or $R^{10}$ and $R^{11}$ being optionally connected to each other;

$R^8$, $R^9$, $R^{10}$ and $R^{11}$ in the general formula (V) being optionally connected to each other to form a crosslinked ring; and

$R^{14}$ represents a divalent arylene group, aralkylene group, polymethylene group or alkylene group; and

wherein the content of the compound represented by general formula (I), (II), (III), (IV), (V) or (VI) is in the range of 0.01 to 1.0 times by weight of the phthalocyanine pigment.

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**5,035,970**

## ENCAPSULATED TONER COMPOSITIONS AND PROCESSES THEREOF

**Bing R. Hsieh, Webster; Robert J. Gruber, Pittsford, both of N.Y.; Karen A. Moffat, Brantford, Canada; Walter Mychajlowskij, Georgetown, Canada, and Anthony J. Paine, Mississauga, Canada, assignors to Xerox Corporation, Stamford, Conn.**

**Filed Oct. 2, 1989, Ser. No. 416,071**

**Int. Cl.[5] G03C** *1/72;* **G03G** *5/00, 9/00*

**U.S. Cl. 430—109** **38 Claims**

1. A toner composition comprised of a core comprised of pigments, dyes or mixtures thereof, and a polymer; and wherein the core is encapsulated in a telechelic polyester shell obtained by reacting a polyester with acid halide terminating groups thereon with a mono, di, or polyfunctional nucleophile, whereby the acid halide terminating groups of the polyester react with said nucleophile.

## 5,035,971
## ELECTROSTATIC PHOTOGRAPHIC LIQUID DEVELOPER

**Eiichi Kato, and Kazuo Ishii, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Oct. 27, 1989, Ser. No. 427,386**
**Claims priority, application Japan, Oct. 27, 1988, 63-269468**
**Int. Cl.[5] G03G 9/12**
**U.S. Cl. 430—114** **7 Claims**

1. An electrostatic photographic liquid developer comprising a nonaqueous solvent with an electric resistance of 109 Ωcm or more and a dielectric constant of 3.5 or less, having a resin dispersed therein, wherein dispersion resin particles are copolymer resin particles obtained by the copolymerization reaction of solutions containing at least one monofunctional monomer (A) which is soluble in the nonaqueous solvent but which is rendered insoluble by polymerization, and monomer (B) which is represented by the general formula (II) below

(II)

wherein

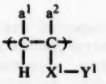
$R^1$ represents an aliphatic group with 8 or more carbon atoms;

T represents —COO—, —CONH—,

where $R^2$ represents an aliphatic group, —OCO—, —$CH_2$COO— or —O—; and

$b^1$ and $b^2$, which may be the same or different, each represents a hydrogen atom, an alkyl group, a —$COOR^3$ group, or a —$CH_2$—$COOR^3$ group, where $R^3$ represents an aliphatic group, which contains an aliphatic group with 8 or more carbon atoms and which produces a copolymer by polymerization with monomer (A); in the presence of a dispersion stabilization resin which is soluble in the nonaqueous solvent, which comprises an acidic group selected from the group consisting of a —$PO_3H_2$ group, an —$SO_3H$ group, a —COOH group, an —OH group, an —SH group, or a

group, where $R^0$ denotes a hydrocarbon bonded only to one terminal of at least one main polymer chain and which is a polymer containing the repeating unit represented by the following general formula (I)



(I)

wherein

$X^1$ represents —COO—, —OCO—, —$CH_2OCO$—, —$CH_2COO$—, —O— or —$SO_2$—;

$Y^1$ represents an aliphatic group with 6 to 32 carbon atoms; and

$a^1$ and $a^2$ which may be the same or different, each represents a hydrogen atom, a halogen atom, a cyano group, a hydrocarbon group with 1 to 8 carbon atoms, a—COO—$Z^1$ group, or a —COO—$Z^1$ group linked via a hydrocarbon group with 1 to 8 carbon atoms, where $Z^1$ represents a hydrocarbon group with 1 to 22 carbon atoms; and wherein a portion of said polymer is cross-linked.

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## 5,035,972
## AB DIBLOCK COPOLYMERS AS CHARGE DIRECTORS FOR NEGATIVE ELECTROSTATIC LIQUID DEVELOPER

**Lyla M. El-Sayed, West Chester, Pa., and Loretta Ann G. Page, Newark, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.**

**Filed Oct. 31, 1989, Ser. No. 429,690**
**Int. Cl.[5] G03G 13/10**
**U.S. Cl. 430—114** **52 Claims**

1. An improved negative electrostatic liquid developer consisting essentially of

(A) a nonpolar liquid having a Kauri-butanol value of less than 30, present in a major amount,

(B) thermoplastic resin particles having an average by area particle size of less than 10 μm, and

(C) an AB diblock copolymer charge director substantially soluble in component (A), wherein the B block is a polymer substantially soluble in Component (A) having a number average molecular weight in the range of about 2,000 to 50,000, and the A block is a quaternized trialkyl amino polymer having a number average molecular weight in the range of about 200 to 10,000, the number average degree of polymerization ratio of the B block to the A block being in the range of 10 to 2 to 100 to 20.

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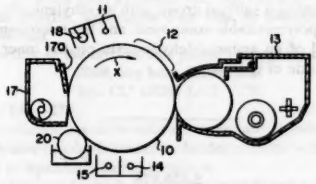
## 5,035,973
## IMAGE FORMING METHOD AND APPARATUS THEREFOR

**Eiichi Kaga, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Nov. 1, 1988, Ser. No. 265,530**
**Claims priority, application Japan, Nov. 6, 1987, 62-279066**
**Int. Cl.[5] G03G 21/00, 5/00, 9/00, 13/14**
**U.S. Cl. 430—125** **16 Claims**




1. An image forming method comprising the steps of:

forming an electrostatic latent image on an image-carrying body in an image forming apparatus;

developing the electrostatic latent image using a developing agent; and

transferring the developed image to an image-carrying medium,

wherein nitrate ions are formed on the image-carrying body as a result of forming the image over repeated cycles, a compound which reacts with nitrate ions and forms a water-insoluble substance is deposited on the image-carrying body and subsequently reacts with said nitrate ions, and then a cleaning is performed continuously or at intervals on the surface of said image-carrying body, thus removing the water-insoluble substance.

**5,035,974**

## LIGHT-IMAGE FORMING MATERIAL

**Keiso Saeki, and Toshiaki Endo, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Jun. 15, 1989, Ser. No. 366,392**

**Claims priority, application Japan, Jun. 16, 1988, 63-148907; Jun. 16, 1988, 63-148908**

**The portion of the term of this patent subsequent to Oct. 9, 2007, has been disclaimed.**

**Int. Cl.[5] G03C *1/72***

**U.S. Cl. 430—138** **10 Claims**

1. A light-image forming material comprising a support having provided thereon a light-image forming layer consisting essentially of microcapsules containing an oxidative-developable leuco dye and a photo-oxidizing agent, and a reducing agent outside said microcapsules, and a covering layer or an intermediate layer containing a film-forming high-molecular binder and/or an inorganic or organic pigment, and wherein the shell of said microcapsules is comprises of a substance which separates the substances inside the microcapsule from those outside the microcapsule at room temperature and wherein the permeability of the shell material is increased only when heated to a specific temperature or higher.

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**5,035,975**

## LIGHT-SENSITIVE MATERIAL CONTAINING SILVER HALIDE REDUCING AGENT AND POLYMERIZABLE COMPOUND

**Ryuichi Takahashi, and Taku Nakamura, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Feb. 16, 1990, Ser. No. 481,079**

**Claims priority, application Japan, Feb. 17, 1989, 1-37782**

**Int. Cl.[5] G03C *1/72***

**U.S. Cl. 430—138** **9 Claims**

1. A light-sensitive material comprising a support and a light-sensitive layer provided thereon which contains silver halide, a reducing agent and an ethylenically unsaturated polymerizable compound, said silver halide and said polymerizable compound being contained in oily droplets which are a core material of microcapsules;

wherein the oily droplet has a film therearound which is composed of a reaction product of a water soluble polymer having a sulfinyl group with an ethylenically unsaturated polymerizable compound, and the microcapsule has a shell of an amino-aldehyde resin on the inner side or outer side of the film.

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**5,035,976**

## PHOTOSENSITIVE ARTICLE HAVING PHENOLIC PHOTOSENSITIZERS CONTAINING QUINONE DIAZIDE AND ACID HALIDE SUBSTITUENTS

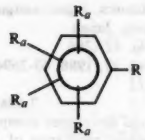
**Robert E. Potvin, West Warwick; Jonas O. St. Alban, Westerly, and Chester J. Sobodacha, Coventry, all of R.I., assignors to Hoechst Celanese Corporation, Somerville, N.J.**

**Division of Ser. No. 170,538, Mar. 21, 1988, Pat. No. 4,902,785, which is a division of Ser. No. 859,284, May 2, 1986, Pat. No. 4,732,836. This application Nov. 3, 1989, Ser. No. 431,342**

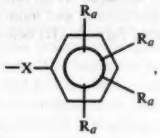
**Int. Cl.[5] G03C *1/54***

**U.S. Cl. 430—165** **18 Claims**

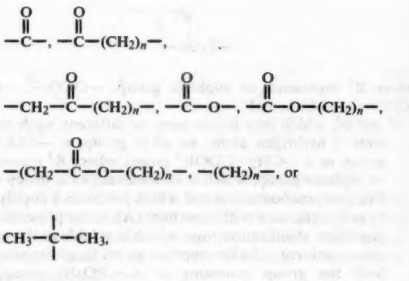
1. A photosensitive article comprising a substrate and a photosensitive composition on the substrate, the photosensitive composition comprising a photosensitive compound prepared by: condensing a phenolic compound represented by the general formulae (A), (B) or (C):



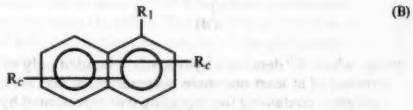

wherein R is H, —X—$R_b$, or



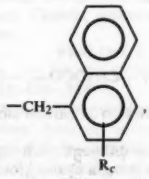

$R_a$ is H, —OH, halogen or lower alkyl, with at least two and not greater than six $R_a$ radicals being —OH, X is a single C—C bond, —O—, —S—, —$SO_s$—,



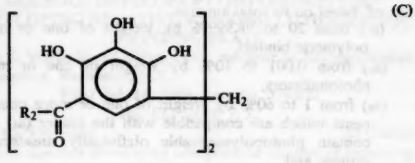

n is 1 or 2, $R_b$ is H, alkyl, aryl, substituted alkyl or substituted aryl;




wherein $R_1$ is H or




$R_c$ is H or —OH with at least two $R_c$ radicals being —OH; and



(C)

wherein $R_2$ is H, alkyl, aryl, substituted alkyl or substituted aryl; with a 1,2-naphthoquinonediaxide-4-sulfonic acid (Diazo) and with an organic acid halide represented by the formula W-R3, wherein W is

or —$SO_2$—V, V is halogen, R3 is alkyl, aryl substituted alkyl or substituted aryl; wherein the molar ratio of the amount of Diazo to the amount of organic acid halide to be reacted is in the range of from about 1:1 to about 39:1.

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**5,035,977**

## INFRARED ABSORBING OXONOL DYES FOR DYE-DONOR ELEMENT USED IN LASER-INDUCED THERMAL DYE TRANSFER

**Charles D. DeBoer, and Steven Evans, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jun. 16, 1989, Ser. No. 367,062**

**Int. Cl.[5] B41M** *5/035, 5/26*

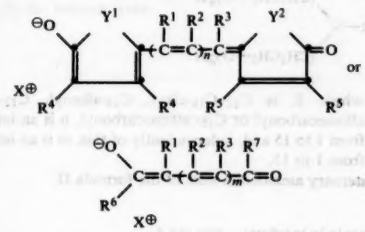
**U.S. Cl. 430—200** **16 Claims**

7. In a process of forming a laser-induced thermal dye transfer image comprising

(a) imagewise-heating by means of a laser a dye-donor element comprising a support having thereon a dye layer and an infrared-absorbing material which is different from the dye in said dye layer, and

(b) transferring a dye image to a dye-receiving element to form said laser-induced thermal dye transfer image,

the improvement wherein said infrared-absorbing material is an oxonol dye having the following formula:



or



wherein:

$R^1$, $R^2$ and $R^3$ each independently represents hydrogen, halogen, cyano, alkoxy, aryloxy, acyloxy, aryloxycarbonyl, alkoxycarbonyl, carbamoyl, sulfonyl, acyl, acylamido, alkylamino, arylamino or a substituted or unsubstituted alkyl, aryl or hetaryl group; or any two of said $R^1$, $R^2$ and $R^3$ groups may be joined together to complete a 5- to 7-membered substituted or unsubstituted carbocyclic or heterocyclic ring; or either $R^1$ or $R^2$ may be joined to $R^4$ or $R^6$ to complete a 5- to 7-membered substituted or unsubstituted carbocyclic or heterocyclic ring; or $R^2$ or $R^3$ may be joined to $R^5$ or $R^7$ to complete a 5- to 7-membered substituted or unsubstituted carbocyclic or heterocyclic ring;

each $R^4$ and $R^5$ independently represents hydrogen, halogen, cyano, alkoxy, aryloxycarbonyl, alkoxycarbonyl, carbamoyl, sulfamoyl, sulfonyl, acyl, nitro or a substituted or unsubstituted alkyl, aryl or hetaryl group;

$R^6$ and $R^7$ each independently represents alkoxy, aryloxy, alkylamino, arylamino, or a substituted or unsubstituted alkyl, aryl or hetaryl group;

$Y^1$ and $Y^2$ each independently represents sulfur, oxygen or NR, where R is a substituted or unsubstituted alkyl group having from 1 to about 6 carbon atoms, or a substituted or unsubstituted aryl or hetaryl group;

n is 1 to 3;

m is 3 to 5; and

X is a monovalent cation.

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**5,035,978**

## IMAGE RECEIVING ELEMENT FOR USE IN A SILVER COMPLEX DIFFUSION TRANSFER PROCESS

**Anthony M. Barnett, Bushey; Colin J. Gray, Harrow, and Julie Baker, Rickmansworth, all of England, assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jul. 12, 1990, Ser. No. 551,363**

**Claims priority, application United Kingdom, Oct. 24, 1989, 8923906**

**Int. Cl.[5] G03C** *5/54*

**U.S. Cl. 430—233** **4 Claims**

1. A non-light-sensitive image-receiving element for use in a silver complex diffusion transfer process; said element including a silver receptive layer containing development nuclei which function to form an image from said silver complex and said element comprising, in at least one layer thereof, at least one tone-controlling compound selected from the group consisting of thiazolidine carboxylic acids, γ-thiobutyrolactones and higher alkyl thioglycolates wherein the higher alkyl group contains at least six carbon atoms; said tone-controlling compound being incorporated in said element in an amount, within the range of 1 to 500 $mg/m^2$, sufficient to accelerate the physical development of silver occurring in the presence of said development nuclei in said silver complex diffusion transfer process.

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**5,035,979**

## RADIATION-SENSITIVE MIXTURE

**Son Nguyen-Kim, Hemsbach; Gerhard Hoffmann, Otterstadt, and Reinhold Schwalm, Wachenheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Oct. 17, 1989, Ser. No. 422,456**

**Claims priority, application Fed. Rep. of Germany, Nov. 4, 1988, 3837438**

**The portion of the term of this patent subsequent to Jul. 23, 2008, has been disclaimed.**

**Int. Cl.[5] G03C** *1/73, 1/76*

**U.S. Cl. 430—270** **10 Claims**

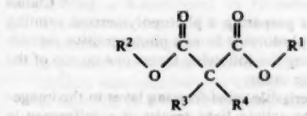
1. A radiation-sensitive mixture essentially consisting of

(a) a water-insoluble binder or binder mixture which is soluble in aqueous alkaline solutions,

(b) a compound which upon irradiation forms a strong acid and

(c) one or more organic compounds which inhibit the solubility of (a) in aqueous alkaline solutions,

wherein the organic compound (c) is a malonic acid ester of the general formula (I)



(I)

where

$R^1$ and $R^2$ may be identical or different and each is alkyl,

cycloalkyl, aralkyl, trialkylsilyl or a heterocyclic radical, or $R^1$ and $R^2$ together form an oxygen-containing six-membered heterocyclic ring, and

$R^3$ and $R^4$ are identical or different and each is hydrogen, halogen, alkyl, cycloalkyl, alkoxy, aralkyl, aryl, aralkyl which is halogen-substituted in the aryl moiety or halogen-substituted aryl.

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**5,035,980**

## PHOTOSENSITIVE SEMI-AQUEOUS DEVELOPABLE GOLD CONDUCTOR COMPOSITION

**William J. Nebe, Wilmington, Del., and Osborne, James J., Kennett Square, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Aug. 21, 1989, Ser. No. 396,490**

**The portion of the term of this patent subsequent to Mar. 13, 2007, has been disclaimed.**

**Int. Cl.[5] G03F 7/033**

**U.S. Cl. 430—281** **9 Claims**

1. In a semi-aqueous developable photosensitive gold conductor composition which is fireable in an oxidizing or substantially nonoxidizing atmosphere comprising an admixture of:

(a) finely divided particles of gold solids having a surface area-to-weight ratio of no greater than 20 $m^2/g$ and at least 80 percent 0.5–10 $\mu m$ and

(b) finely divided particles of an inorganic binder having a glass transition temperature in the range of from 550 to 825° C., a surface area-to-weight ratio of no greater than 10 $m^2/g$ and at least 90 percent by weight of the particles having size of 1–10 $\mu m$, the weight ratio of (b) to (a) being in a range from 0.0001 to 0.25, dispersed in an organic vehicle comprising

(c) an organic polymeric binder,

(d) a photoinitiation system,

(e) photohardenable monomer,

(f) an organic medium

wherein the improvement comprises the organic polymeric binder is a copolymer or interpolymer selected from the group consisting of (1) a nonacidic comonomer comprising a $C_1$–$C_{10}$ alkyl acrylate, a $C_1$–$C_{10}$ alkyl methacrylate or combinations thereof, and (2) an acidic comonomer comprising an ethylenically unsaturated carboxylic acid, with the proviso that all acidic comonomers comprise from 5 to less than 15 weight percent of the polymer, wherein the organic polymeric binder has a molecular weight no greater than 100,000 and wherein the composition upon imagewise exposure to actinic radiation is developable in an aqueous solution containing 0.63 percent by weight sodium borate and 8.7 percent by weight butyl cellusolve.

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**5,035,981**

## MULTILAYER, SHEET-LIKE, PHOTOSENSITIVE RECORDING MATERIAL

**Karl-Rudolf Kurtz, Heidelberg; Horst Koch, Gruenstadt; Thomas Telser, Ludwigshafen, and Helmut Bach, Mutterstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Division of Ser. No. 264,893, Oct. 31, 1988, Pat. No. 4,946,758. This application Feb. 6, 1990, Ser. No. 475,802**

**Claims priority, application Fed. Rep. of Germany, Oct. 31, 1987, 3736980**

**Int. Cl.[5] G03F 7/30, 7/09**

**U.S. Cl. 430—327** **8 Claims**

1. In a process for preparing a photopolymerized printing plate, relief plate or photoresist from a photosensitive recording element comprising the following layers one on top of the other in the following order:

**(A) a photopolymerizable relief-forming layer in the imagewise exposure to actinic light results in a difference in solubilities between the exposed and unexposed parts, so that the layer can be developed with organic, aqueous alcoholic or aqueous alkaline liquid media, the photopolymerizable relief-forming layer (A) consisting essentially of, based on its total amount,**

**($a_1$) from 20 to 98.999% by weight of one or more polymeric binders,**

**($a_2$) from 0.001 to 10% by weight of one or more photoinitiators,**

**($a_3$) from 1 to 60% by weight of one or more components which are compatible with the binder ($a_1$) and contain photopolymerizable olefinically unsaturated groups, and**

**($a_4$) from 0 to 40% by weight of one or more assistants,**

**(B) a non-tacky layer which is transparent to light and soluble or swellable in the relevant liquid media, being formed from a polymer forming films of high tensile strength, the top layer (B) adhering more firmly to the layer (A) than to the cover sheet (C) and**

**(C) a cover sheet which can be readily peeled off from the top layer (B);**

by

(1) peeling off the cover sheet (C) from the top layer (B),

(2) positioning an image mask or photographic negative on the top layer (B),

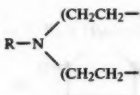
(3) imagewise exposing the photopolymerizable relief-forming layer (A) to actinic light of a wavelength $\lambda$ of from 230 to 450 nm through the image mask or photographic negative, and

(4) washing out (developing) the unexposed parts of the imagewise exposed relief-forming layer (A) with organic, aqueous alcoholic or aqueous alkaline media, the top layer (B) also being washed away,

the improvement comprising

preventing the formation of an electrostatic charge on the photosensitive recording element during process step (1) by incorporating into the element a top layer (B) containing, based on its total amount, from 1 to 20% by weight of one or more compounds from the group consisting of

**($b_1$) tertiary amines and amides of the formula I**



I

where R is $C_{12}$–$C_{18}$-alkyl, $C_{18}$-alkenyl, $C_{12}$–$C_{18}$-alkanecarbonyl or $C_{18}$- alkenecarbonyl, n is an integer from 1 to 15 and, independently of this, m is an integer from 1 to 15,

**($b_2$) quaternary ammonium salts of the formula II**

$$[NR^1R^2R^3R^4]^{\oplus}X^{\ominus} \qquad \text{II}$$

where $X^-$ is $Cl^-$, $BR^-$, $I^-$, $R^1$—O—$PO_3H^-$, $(R^1O)_2PO_2^-$, $R^1PO_3^-$, $R^1OSO_3^-$, $R^1$—$COO^-$, $CF_3SO_3^-$ or $R^1$—$OSO_3^-$, $R^1$ is $C_1$–$C_4$-alkyl, $R^2$ and $R^3$ are each $C_1$–$C_{20}$-alkyl or —(—$CH_2CH_2$—O—)$_n$-H, where n is an integer from 1 to 15 and $R^2$ and $R^3$ can be identical or different, $R^4$ is —($CH_2CH_2$—O—)$_n$—H, where n is an from 1 to 15, $C_{12}$-, $C_{14}$-, $C_{16}$- and $C_{18}$-alkyl, 3-azatridecan-1-yl to 3-azadocosan-1-yl, 4-azatridecan-1-yl to 4-azadocosan-1-yl, 3-aza-4-oxotridecan-1-yl to 3-aza-4-oxodocosan-1-yl, 4-aza-5-oxotridecan-1-yl to 4-aza-5oxodocosan-1-yl, 3-oxatridecan-1-yl to 3-oxadocosan-1-yl, 4-oxatridecan-1-yl to 4-oxadocosan-1-yl or 2-hydroxy-4-oxatridecan-1-yl to 2-hydroxy-4-oxadocosan-1-yl.

5,035,982

## AQUEOUS DEVELOPER COMPOSITION FOR DEVELOPING NEGATIVE WORKING LITHOGRAPHIC PRINTING PLATE

John E. Walls, Fort Collins, Colo., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 14, 1989, Ser. No. 379,823
Int. Cl.[5] G03F 7/32
U.S. Cl. 430—331 33 Claims

1. An aqueous developing composition capable of removing the unexposed portion of a lithographic printing plate having a polymeric binder in a negative working element which comprises

(a) from about 0.5 to about 20 percent by weight of nontoxic developing vehicle, said vehicle being a nonsolvent for any of the components of the lithographic plate;

(b) from about 0.25 to about 11 percent by weight of a first surfactant comprising a sodium, potassium or lithium salt of xylene sulfonic acid;

(c) from about 0.1 to about 6 percent by weight of a second surfactant comprising a sodium, potassium or lithium salt of toluene sulfonic acid, ethyl benzene sulfonic acid, cumene sulfonic acid or mesitylene sulfonic acid;

(d) from about 0.01 to about 3 percent by weight of a third surfactant comprising a sodium, potassium or lithium salt of an alkyl substituted benzene sulfonic acid where the alkyl group contains at least 10 carbon atoms or a sodium, potassium or lithium salt of an alkyl substituted naphthalene sulfonic acid where the alkyl group contains from 1 to 4 carbon atoms;

(e) from about 0.1 to about 8 percent by weight of a cold water soluble polymeric film forming agent;

(f) from about 0.05 to about 6 percent by weight of a desensitizing agent having the formula

where $R_1$ is alkanol having 1 to 4 carbon atoms and $R_2$ and $R_3$ are independently chosen from hydrogen, alkyl having 1 to 4 carbon atoms or $R_1$; and

(g) an effective amount of an acid to bring the pH of the aqueous developing composition to from about 4 to about 10; the balance water.

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5,035,983

## METHOD AND COMPOSITION FOR LASER-MARKING

Toshiyuki Kiyonari, Urawa; Satoshi Hirabayashi, Omiya, and Naoto Kidokoro, Ageo, all of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan

Filed May 31, 1989, Ser. No. 359,638
Claims priority, application Japan, May 31, 1988, 63-134107; Nov. 17, 1988, 63-290605
Int. Cl.[5] G03C 1/28, 5/00
U.S. Cl. 430—346 7 Claims

1. A method for laser-marking characterized by marking the surface of an object comprising a non-black inorganic lead compound and a resin by exposure to laser beams having wavelengths falling in the far infrared region, wherein the non-black inorganic lead compound is basic lead phosphite and/or basic lead sulfite.

5,035,984

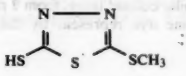
## METHOD FOR FORMING A DIRECT POSITIVE IMAGE

Kazunoi Hayashi, deceased, late of Hikone; Masahiro Hayashi, legal representative; Masako Hayashi, legal representative, both of Nara, all of Japan, and , assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

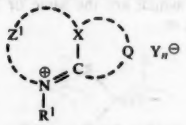
Filed Nov. 6, 1989, Ser. No. 432,003
Claims priority, application Japan, Nov. 4, 1988, 63-278589
Int. Cl.[5] G03C 5/50, 1/485
U.S. Cl. 430—378 4 Claims

1. A method for forming a direct positive image comprising the steps of:

(a) imagewise exposing a photosensitive material comprising a support having thereon at least one light-sensitive silver halide emulsion layer containing non-prefogged silver halide grains capable of forming an internal latent image; at least one of the light-sensitive emulsion layer or the other hydrophilic colloidal layer in the photosensitive material containing the following compound (a):

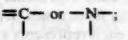


(b) developing said exposed material in the presence of a developing agent and at least one nucleating agent represented by formula (N-I):



(N-I)

wherein $Z^1$ represents a nonmetallic atomic group necessary for forming a 5-membered or 6-membered hetero ring, a 5-membered or 6-membered heterocyclic ring fused with an aromatic ring, or a 5-membered or 6-membered heterocyclic ring fused with a heterocyclic ring; $R^1$ represents an aliphatic group; X represents



Q represents a nonmetallic atomic group necessary for forming a 4-membered to 12-membered non-aromatic hydrocarbon ring or a 4-membered to 12-membered non-aromatic heterocyclic ring; Y represents a counter ion necessary for charge balance; and n is the number of counter ions necessary for charge balance; provided that at least one of $R^1$, $Z^1$ or Q comprises at least one alkynyl group; and

(c) at least one of fixing and bleaching said developed photosensitive material to form a positive image.

## 5,035,985

## SILVER HALIDE PHOTOGRAPHIC DEVELOPMENT AND WASHING PROCESS OF THE CONTAINING ELEMENT

**Keiichi Adachi; Shigeru Ohno, and Kokichi Waki, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Continuation of Ser. No. 310,028, Feb. 8, 1989, abandoned, which is a continuation-in-part of Ser. No. 138,112, Dec. 28, 1987, abandoned. This application Jun. 7, 1990, Ser. No. 534,299**

**Claims priority, application Japan, Dec. 25, 1986, 61-314428; May 6, 1987, 62-110333**

**Int. Cl.[5] G03C *1/73***

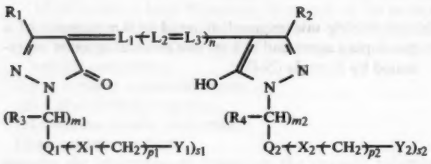
**U.S. Cl. 430—432** **15 Claims**

1. A method for processing a silver halide photographic element comprising the steps of:

(a) imagewise exposing a silver halide photographic element to actinic radiation;

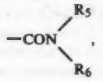
(b) developing the resulting element of step (a); and

(c) washing the resulting element of step (b); wherein the washing in step (c) is carried out at at least 15° C. to 45° C. for at least 10 sec. to 90 sec., and wherein the silver halide color photographic element comprises a support having provided thereon at least one silver halide emulsion layer, wherein the silver halide photographic element contains in a hydrophilic colloid layer, from 2 mg/m$^2$ to 40 mg/m$^2$ of at least one dye represent by the following general formula (I):



(I)

wherein $R_1$ and $R_2$, which are the same or different, each represents —$COOR_5$, or



$R_3$ and $R_4$, which are the same or different, each represents a hydrogen atom or an alkyl group, $R_5$ and $R_6$, which are the same or different, each represents a hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted aryl group, when $R_1$ and $R_2$ represent —$COOR_5$ and $R_5$ represents a hydrogen atom, $R_1$ and $R_2$ represent a carboxyl group which can for a salt, $R_5$ and $R_6$ can combine together to form a 5-or 6-membered ring, $Q_1$ and $Q_2$, which are the same or different, each represents a substituted or unsubstituted aryl group, $X_1$ and $X_2$, which are the same or different, each represents a divalent linking group or a bond, $Y_1$ and $Y_2$, which are the same or different, each represents a sulfo group or a carboxyl group which can form a salt, $L_1$, $L_2$ and $L_3$, which are the same or different, each represents a substituted or unsubstituted methine group, $m_1$ and $m_2$ each is 1 or 2, n is 0, 1 or 2, $p_1$ and $p_2$ each is 0, 1, 2, 3, or 4, and $s_1$ and $s_2$ each is 1 or 2.

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## 5,035,986

## SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL

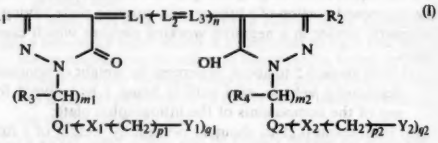
**Nobuo Sakai, and Shigeru Ohno, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Jan. 30, 1989, Ser. No. 303,204**

**Int. Cl.[5] G03C *1/825***

**U.S. Cl. 430—522** **10 Claims**

1. A silver halide color photographic material comprising photographic constituent layers containing at least one light-sensitive silver halide emulsion layer and at least one light-insensitive layer on a reflective support, wherein at least one of said photographic constituent layers comprises at least one dye represented by formula (I), at least one of said light-sensitive silver halide emulsion layers comprises silver halide grains substantially comprising cubic silver chlorobromide having a silver chloride content of 95 mol % or more and said reflective support comprises 3.0 g/m$^2$ or more of titanium oxide:



(I)

wherein $R_1$ and $R_2$ each represents an alkyl group, an aryl group, a cyano group, —$COOR_5$, —$CONR_5R_6$, —$COR_7$, —$SO_2R_7$, —$SOR_7$, —$SO_2NR_5R_6$, —$OR_5$, —$NR_5R_6$, —$NR_6COR_7$, —$NR_5CONR_5R_6$ or —$NR_6SO_2R_7$ in which $R_5$ and $R_6$ each represents a hydrogen atom, an alkyl group or an aryl group, $R_7$ represents an alkyl group or an aryl group, and $R_5$ and $R_6$ or $R_6$ and $R_7$ may be connected to each other to form a 5- or 6-membered ring; $R_3$ and $R_4$ each represents a hydrogen atom; $Q_1$ and $Q_2$ each represents a phenyl group; $X_1$ and $X_2$ each represents a bond or divalent connecting group; $Y_1$ and $Y_2$ each represents a sulfo group or a carboxyl group; $L_1$, $L_2$ and $L_3$ each represents a substituted or unsubstituted methine group; n represents an integer 0, 1 or 2; $m_1$ and $m_2$ each represents an integer 1; $p_1$ and $p_2$ each represents an integer 0, 1, 2, 3, or 4; and $q_1$ and $q_2$ each represents an integer 1, 2 or 3.

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## 5,035,987

## COLOR PHOTOGRAPHIC RECORDING MATERIAL CONTAINING A DIR COUPLER

**Heinrich Odenwälder; Thomas Krüger, both of Leverkusen, and Hans-Joachim Schumann, Cologne, all of Fed. Rep. of Germany, assignors to Agfa Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

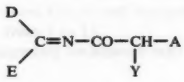
**Filed Sep. 21, 1990, Ser. No. 586,516**

**Claims priority, application Fed. Rep. of Germany, Oct. 5, 1989, 3933238**

**Int. Cl.[5] G03C *7/36***

**U.S. Cl. 430—544** **2 Claims**

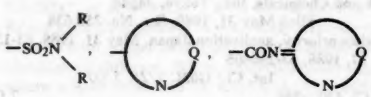
1. A color photographic recording material comprising at least one photosensitive silver halide emulsion layer and a DIR coupler associated therewith, characterized in that the coupler corresponds to formula I

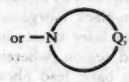


(I)

in which

A represents halogen, —OR, —SR, —CONHR, —$SO_2R$, —$SO_2NHR$,





R represents alkyl, aralkyl, aryl or hetaryl;

Q represents a substituent for completing a 5- or 6-membered heterocyclic ring;

D and E, which may be the same or different, represent subtituents attached to the C atom of the C=N group by a C, O, S or N atom, including those substituents which, together with the C atom of the C=N group, complete a carbocyclic or heterocyclic ring;

Y represents a group having a silver halide development inhibiting function which is releasable during color development.

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**5,035,988**

## SILVER HALIDE PHOTOGRAPHIC MATERIAL CONTAINING A YELLOW COUPLER AND A PHOSPHORUS COMPOUND AND COLOR IMAGE FORMING METHOD

**Yoshisada Nakamura; Masakazu Morigaki; Yoshio Ishii, and Kei Sakanoue, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed May 12, 1989, Ser. No. 351,139**

**Claims priority, application Japan, May 12, 1988, 63-115731; May 12, 1988, 63-115732; May 13, 1988, 63-117961**

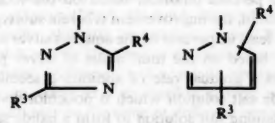
**Int. Cl.[5] G03C *1/34, 7/36***

**U.S. Cl. 430—551** **19 Claims**

1. A silver halide color photographic material containing at least one yellow coupler represented by the following general formula (I) and at least one compound represented by the following general formula

(I)

wherein $R^1$ represents a substituted or unsubstituted N-phenylcarbamoyl group; $R^2$ represents an alkyl group of an aryl group; $X^1$ represents a group represented by the following formula (a), (b), (c) or (d):



(a) (b)

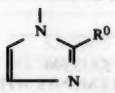
wherein $R^3$ and $R^4$, which may be the same or different, each is a hydrogen atom, a halogen atom, a carboxylic acid ester group, an amino group, an alkyl group, an alkylthio group, an alkoxy group, an alkylsulfonyl group, an alkylsulfinyl group, a carboxyl group, a sulfonic acid group or a salt thereof, a substituted or unsubstituted phenyl group or a heterocyclic ring,

(c)

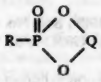
wherein $W^1$ represents a non-metallic atom required for forming a four-membered, five-membered or six-membered ring together with the moiety

in the formula (c),

(d)



wherein $R^0$ represents an N-arylcarbamoyl group,

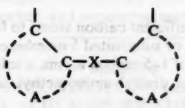


(A-I)

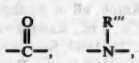
wherein R represents $-(Y)_n-R'$; Y represents —O—, —S—, —NH— or

n is 0 or 1; R′ and R″, which may be the same or different, each represents an alkyl group, an alkenyl group, a cycloalkyl group, an aryl group, a heterocyclic group or an acyl group; and Q represents a divalent group of the following formula (A-I-1):

(A-I-1)



wherein A represents an atomic group which forms a substituted or unsubstituted benzene ring; X represents a single bond, a substituted or unsubstituted methylene group, —S—, —O—, —NH—,



$-SO_2-$ —SO—; R‴ represents a hydrogen atom, an alkyl group, an alkenyl group, a cycloalkyl group, an aryl group, a heterocyclic group, an acyl group or a sulfonyl group; and the free bonds in the formula (A-I-1) represent the bonding positions to O atoms at the position of Q in the formula (A-I).

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**5,035,989**

## SILVER HALIDE PHOTOGRAPHIC MATERIAL FOR REVERSAL PROCESSING

**Shingo Nishiyama, and Naomi Saeki, both of Ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Nov. 28, 1989, Ser. No. 442,036**

**Claims priority, application Japan, Nov. 28, 1988, 63-300181; Nov. 28, 1988, 63-300182**

**Int. Cl.[5] G03 *1/005***

**U.S. Cl. 430—567** **13 Claims**

1. A silver halide photographic material for reversal processing, which comprises a support having provided thereon at least one hydrophilic colloidal layer, said at least one hydrophilic colloidal layer is a light-sensitive silver halide emulsion layer, silver halide grains of said silver halide emulsion are of a core/shell structure comprising a core portion and a shell portion, and said core portion is substantially composed of silver bromide and said shell portion is composed of two layers, with the first shell portion in contact with said core portion substantially comprising silver bromoiodide and the second shell portion outside the first shell portion substantially comprising silver bromide, wherein the difference in silver iodide

content between the two shell portions is less than 6 mol % and wherein said shell portion contains 0.5 to 6 mol % of silver iodide.

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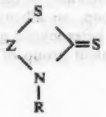
**5,035,990**

## RADIOGRAPHIC ELEMENTS WITH IMPROVED COVERING POWER

**Dietrich M. Fabricius, and Otho P. Hoyte, both of Hendersonville, N.C., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Nov. 28, 1989, Ser. No. 445,957**
**Int. Cl.[5] G03C *1/02***
**U.S. Cl. 430—567** **6 Claims**

1. In a tabular grain emulsion wherein at least 50% of said grains are tabular silver halide grains with a thickness of at least 0.1 μm, preferably with a thickness of about 0.2 μm, and an aspect ratio of greater than 2:1, dispersed in a binder, and wherein said tabular grain emulsion is a negative working radiographic element, the improvement comprising in said emulsion a covering power enhancing amount of a thione with the following structure:



wherein Z represents sufficient carbon atoms to form a 5 membered or aromatic ring, or substituted 5 membered or aromatic ring, and R is an alkyl of 1–5 carbon atoms, a sulfoalkyl group of 2–5 carbon atoms, a dialkyl aminomethyl or a hydroxymethyl group.

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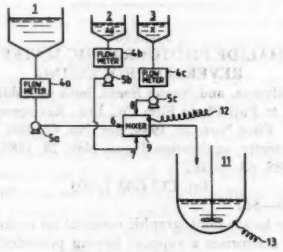
**5,035,991**

## CONTROL PROCESS AND APPARATUS FOR THE FORMATION OF SILVER HALIDE GRAINS

**Yasunori Ichikawa; Hiroshi Ohnishi; Shigeharu Urabe; Akira Kojima, and Akira Katoh, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Dec. 21, 1989, Ser. No. 454,254**
**Claims priority, application Japan, Dec. 22, 1988, 63-322171**
**The portion of the term of this patent subsequent to Nov. 7, 2006, has been disclaimed.**
**Int. Cl.[5] G03C *1/015***
**U.S. Cl. 430—569** **1 Claim**




1. A control process for the formation of silver halide grains comprising the steps of:

disposing a mixer outside of a reaction vessel containing an aqueous protective colloid solution and causing at least one of a nucleus formation and a crystal growth of silver halide grains, said mixer including a rotatable stirring blade;

supplying at various flow rates an aqueous solution of a water-soluble silver salt, an aqueous solution of a water-soluble halide, and an aqueous solution of a protective colloid to the mixer while controlling the flow rates of said aqueous solutions;

mixing the aqueous solutions while controlling the rotational speed of said stirring blade to form fine, silver halide grains; and

immediately supplying the fine grains to the reaction vessel to perform said at least one of the nucleus formation and the crystal growth of the silver halide grains in the reaction vessel;

further comprising measuring a silver ion potential of the fine grains formed in the mixer or the silver ion potential in the reaction vessel, and controlling the flow rate of at least one of the aqueous silver salt solution, the aqueous halide solution, and the aqueous protective colloid solution being added to the mixer, such that a measured value of the silver ion potential equals a predetermined value.

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**5,035,992**

## PROCESS FOR THE STABILIZATION OF HIGH-CHLORIDE CRYSTALS WITH MODIFIED CRYSTAL HABIT USING BROMIDE SHELLS

**William A. Houle, Kimberton, Pa., and Thomas P. Tufano, Hockessin, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Nov. 30, 1989, Ser. No. 443,547**
**Int. Cl.[5] G03C *1/02, 1/34***
**U.S. Cl. 430—569** **15 Claims**

1. A process for stabilizing the crystalline grain morphology of a radiation sensitive photographic emulsion by bringing into contact, in a vessel in the presence of a dispersing medium and a crystal modifying amount of an aminoazapyridine growth modifying agent at a pH in the range of 2.5 to 9.0 and a pCl in the range of 0 to 3, aqueous silver and chloride-containing salt solutions to precipitate silver halide grain cores wherein at least 50% of the total projected area of the total grain population precipitated are noncubic silver halide grain cores, and wherein the halide content of the silver halide emulsion is at least 50 mole percent chloride, based on the total moles of silver precipitated, the improvement wherein subsequent to the addition of at least 60 percent of the aqueous silver salt solution to the vessel based on the total moles of silver precipitated introducing at a gradual rate of addition a second or shell-forming halide salt solution which is nonchloride-rich to the chloride-containing salt solution to form a halide salt solution mixture, the composition of the halide salts in said mixture continuously changing from 0 to 100% concentration of said second or shell-forming halide salt solution which is added in an amount such that a shell of 0.5 to 20 mole % based on the final total moles of silver precipitated, is formed surrounding the chloride-containing grain core.

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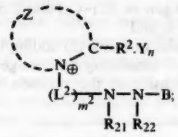
**5,035,993**

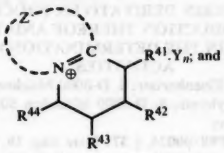
## SILVER HALIDE PHOTOGRAPHIC MATERIAL

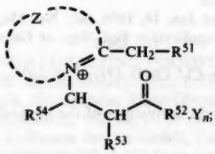
**Shigeo Hirano; Ashita Murai, and Seiji Suzuki, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Continuation of Ser. No. 59,946, Jun. 9, 1987, abandoned. This application Feb. 5, 1990, Ser. No. 474,243**
**Claims priority, application Japan, Jun. 10, 1986, 61-134513**
**Int. Cl.[5] G03C *1/035, 1/485***
**U.S. Cl. 430—598** **16 Claims**

1. A silver halide photographic material which comprises a support having provided thereon at least one light-sensitive silver halide emulsion layer, the silver halide emulsion layer or at least one other hydrophilic colloid layer of said material containing at least one heterocyclic quaternary ammonium salt compound containing a group X that enhances adsorption of silver halide, said compound selected from those represented by the following general formulae:







wherein z represents non-metallic atoms necessary for forming a 5- or 6- membered heterocyclic ring; Y represents a charge-balancing counter-ion; n represents 0 to 1; $R^2$ represents a hydrogen atom, an aliphatic group, or an aromatic group; $L^2$ represents a divalent linkage group; $m^2$ represents 0 or 1; $R^{21}$ and $R^{22}$ both represent hydrogen atoms or one of them represents a hydrogen atom and the other represents a substituted or unsubstituted alkylsulfonyl group, a substituted or unsubstituted arylsulfonyl group, or a substituted or unsubstituted acyl group; B represents a formyl, acyl, arylsulfonyl, alkylsulfonyl, arylsulfinyl, carbomoyl, alkoxycarbonyl, aryloxycarbonyl, sulfinanoyl, alkoxysulfonyl, thioacyl, thiocarbamoyl, sulfanoyl, heterocyclic, aliphatic, or aromatic group; $R^{41}$, $R^{42}$, $R^{43}$, and $R^{44}$, which may be the same or different, are selected from aliphatic groups, hydrogen, and aromatic groups; $R^{52}$ represents hydrogen, alkyl, aryl or araalkyl groups; and $R^{51}$, $R^{53}$, and $R^{54}$, which may be the same or different, are selected from aliphatic groups, hydrogen, and aromatic groups.

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**5,035,994**

## HUMAN STEM CELLS AND MONOCLONAL ANTIBODIES

**Curt I. Civin, Baltimore, Md., assignor to The Johns Hopkins University, Baltimore, Md.**

**Division of Ser. No. 55,942, Jun. 1, 1987, Pat. No. 4,965,204. This application Sep. 7, 1990, Ser. No. 580,337**

**Int. Cl.**[5] **A01N** *1/02;* **A61M** *37/00;* **C12Q** *1/00;* **G01N** *33/53*

**U.S. Cl. 435—2** **12 Claims**

1. A method of isolating a population of human cells containing pluripotent lympho-hematopoletic stem cells comprising:

(a) providing a cell suspension from human tissue, said tissue selected from the group consisting of marrow and blood;

(b) contacting said cell suspension with a monoclonal antibody to immature human marrow cells that is stage-specific and not lineage dependent so that said antibody binds to said stem cells, wherein said antibody specifically binds an antigen on human pluripotent lympho-hematopoletic stem cells said stem cells expressing an antigen that is specifically bound by the monoclonal antibody produced by the hybridomas deposited under ATCC Accession No. HB-8483 and does not specifically bind an antigen on mature, human myeloid and lymphoid cells; and

(c) separating and recovering from said cell suspension the cells bound by said antibody, said bound cells being substantially free of nature lymphoid and myeloid cells.

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**5,035,995**

## TEST METHOD INVOLVING SUBSTANCE-CONJUGATED COMPLEMENT COMPONENT C1Q

**Fumiaki Taguchi, 14-1, Yokodai 5-chome, Sagamihara-shi, Kanagawa-ken; Isamu Mitsui, Yokohama; Kinichi Hara, Yokohama; Masaro Hayashi, Yokohama; Kunio Ezawa, Tokyo; Kenichi Fukunaga, and Jun Kuranari, both of Machida, all of Japan, assignors to Calpis Food Industry Co., Ltd., Tokyo and Fumiaki Taguchi, Kanagawa, both of, Japan**

**Division of Ser. No. 32,025, Mar. 30, 1987, Pat. No. 4,882,423, which is a continuation-in-part of Ser. No. 779,671, Sep. 24, 1985, abandoned. This application May 22, 1989, Ser. No. 355,196**

**Claims priority, application Japan, Oct. 2, 1984, 59-205686; Oct. 25, 1984, 59-223049; May 17, 1985, 60-103898; Jul. 24, 1985, 60-162012; Jul. 29, 1985, 60-166004; Mar. 31, 1986, 61-70936; Mar. 31, 1986, 61-70937; Mar. 31, 1986, 66-70938**

**Int. Cl.**[5] **C12Q** *1/00;* **G01N** *33/535*

**U.S. Cl. 435—4** **20 Claims**

1. A method for measurement by the use of a complement component C1q comprising reacting a marker-labelled complement component C1q with a material to be measured, said complement component C1q being conjugated with the marker via a sulfur atom at at least one site not involved in binding immunoglobulins, thereby to obtain a reaction material having said marker, and measuring said marker.

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**5,035,996**

## PROCESS FOR CONTROLLING CONTAMINATION OF NUCLEIC ACID AMPLIFICATION REACTIONS

**James L. Hartley, Frederick, Md., assignor to Life Technologies, Inc., Gaithersburg, Md.**

**Filed Jun. 1, 1989, Ser. No. 360,120**

**Int. Cl.**[5] **C12Q** *1/68;* **C12P** *19/34;* **C12N** *9/22, 9/78*

**U.S. Cl. 435—6** **4 Claims**

1. A method for controlling contamination in sequential nucleic acid amplification processes comprising first and second nucleic acid amplification processes to amplify nucleic acid sequences in a first and a second sample, respectively, which comprises:

carrying out said first nucleic acid amplification process on said nucleic acid sequence in said first sample in the presence of deoxyuridine triphosphate, to thereby generate a deoxyuracil-containing product of amplification; and

treating said deoxyuracil-containing product of amplification with uracil DNA glycosylase prior to carrying out said second amplification process on said nucleic acid sequence in said second sample.

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**5,035,997**

## REDOX POLYMERIZATION DIAGNOSTIC TEST COMPOSITION AND METHOD FOR IMMUNOASSAY AND NUCLEI ACID ASSAY

**Gerald Oster, 241 W. 11th St., New York, N.Y. 10014, and Baruch J. Davis, Mount Sinai Medical Center, 1 Gustav Levy Pl., New York, N.Y. 10029**

**Filed Feb. 17, 1989, Ser. No. 312,525**

**Int. Cl.**[5] **C12Q** *1/68;* **G01N** *33/543;* **C08F** *2/04, 4/40*

**U.S. Cl. 435—6** **22 Claims**

1. A diagnostic test composition for detecting and measuring an analyte possessing biologic activity, the composition comprising

(a) a redox catalyst system capable of converting a monomer to a polymer, said redox catalyst system operating by free radical initiation, the redox catalyst system comprising one or more chemical moieties and

1) said analyte being combined with a specific ligand, said

analyte either comprising at least one such chemical moiety or

2) in the case that said analyte lacks a redox catalyst property, said analyte is linked by said specific ligand to at least one such moiety or is linked by said specific ligand to a generator of at least one such moiety, said specific ligand being one member of either an antibody/antigen pair or a hybridization probe/target pair, and

(b) at least one monomer capable of undergoing addition polymerization, said monomer being selected from the group consisting of acrylamide, N-octyl acrylamide, methacrylamide, N-methacrylamide, acrylic acid, methacrylic acid, hydroxymethyl acrylamide, methylene bisacrylamide, acrylonitrile, methyl acrylate, ethylene glycol methacrylate, propylene glycol methacrylate, acrylamide propane sulfonic acid, N-(3-aminopropyl)-methacrylamide, pentaerythritoltriacrylate, polyethyleneglycol diacrylate, vinyl pyrrolidine, vinyl pyridine, multivalent salts of acrylic acid, multivalent salts of methacrylic acid and combinations of the aforesaid monomers.

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**5,035,998**

## HYDROLASE SUBSTRATES

**Herbert von der Eltz; Hans-Joachim Guder, both of Weilheim, and Klaus Mühlegger, Polling, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany**

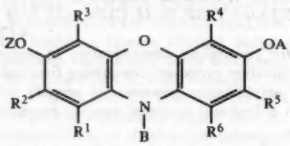
**Division of Ser. No. 135,843, Dec. 21, 1987, Pat. No. 4,900,822. This application Nov. 13, 1989, Ser. No. 434,346**

**Claims priority, application Fed. Rep. of Germany, Dec. 24, 1986, 3644401**

**Int. Cl.[5] C12Q** *1/34, 1/44, 1/42, 1/37*

**U.S. Cl. 435—18** **22 Claims**

**1.** A method for determination of hydrolases which comprises the steps of: (1) contacting a hydrolase to a substrate containing a compound of the formula



wherein

Z is an orthophosphoric, a pyrophosphoric or a sulphuric acid residue, a saturated or unsaturated ($C_1$–$C_{20}$)-alkylcarbonyl; an amino acid or an oligopeptide residue bound by their carboxylic acid ends; or a monosaccharide or oligosaccharide residue;

A is an orthophosphoric, pyrophosphoric or a sulphuric acid residue; a saturated or unsaturated ($C_1$–$C_{20}$)-alkylcarbonyl; an amino acid or an oligopeptide residue bound by their carboxylic acid ends; a ($C_1$–$C_7$)-alkylcarbonyl, optionally unsaturated, which is substituted one or more times by hydroxyl, carboxyl or an ammonium group;

B is a ($C_1$–$C_7$)-alkylcarbonyl optionally substituted one or more times by hydroxyl, carboxyl or an ammonium group;

each of $R^2$ and $R^5$ is hydrogen, halogen or ($C_1$–$C_5$)-alkyl;

each of $R^1$, $R^3$, $R^4$ and $R^6$ is hydrogen; halogen; cyano; ($C_1$–$C_5$)-alkyl; ($C_1$–$C_5$)-alkoxy; carboxyl; ($C_1$–$C_5$)-alkoxycarbonyl; carboxy-($C_1$–$C_5$)-alkyl; ($C_1$–$C_5$)-alkoxycarbonyl-($C_1$–$C_5$)-alkyl; carboxamido optionally substituted once or twice by ($C_1$–$C_5$)-alkyl, ($C_1$–$C_5$)-alkoxy-($C_1$–$C_5$)-alkyl, carboxyl-($C_1$–$C_5$-alkyl) or ($C_1$–$C_5$)-alkoxycarbonyl-($C_1$–$C_5$)-alkyl), or in the case of disubstitution, the two substituents can be joined to form a ring which can be interrupted by oxygen, nitrogen and sulphur atoms; or a radical of the formula

$$—COO—(CH_2CH_2O)_n—R^7$$

in which $R^7$ is hydrogen or ($C_1$–$C_5$)-alkyl, and n is a whole number of from 1 to 4; and

$R^6$ can also be sulpho or nitro; (2) adding thereto an oxidation agent, and (3) measuring the change of absorption of fluorescence intensity in the reaction mixture thereby obtained.

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**5,035,999**

## AMINOLUCIFERIN DERIVATIVES, PROCESSES FOR THE PRODUCTION THEREOF AND THEIR APPLICATION IN THE DETERMINATION OF ENZYME ACTIVITIES

**Reinhard Geiger, Eisenhartstr. 6, D-8000 Müchen 60, and Werner Miska, Haylerstr. 8, D-8000 München 50, both of Fed. Rep. of Germany**

**PCT No. PCT/EP88/00024, § 371 Date Aug. 18, 1988, § 102(e) Date Aug. 18, 1988, PCT Pub. No. WO88/05434, PCT Pub. Date Jul. 28, 1988**

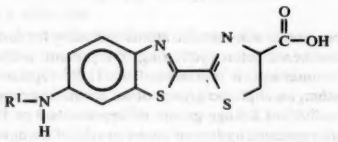
**PCT Filed Jan. 14, 1988, Ser. No. 254,932**

**Claims priority, application Fed. Rep. of Germany, Jan. 14, 1987, 3700908**

**Int. Cl.[5] C07D** *277/68, 417/04*

**U.S. Cl. 435—23** **13 Claims**

**1.** D-aminoluciferin derivatives of the general formula I



(I)

wherein

$R^1$ represents a L-amino acid or peptide radical having up to 10 L-amino acid moieties said radical being bound via the (terminal) carboxyl group in the form of an amide and the free amino group thereof is optionally be protected by a common protecting group, or wherein $R^1$ represents a monosaccharide or disaccharide radical.

**10.** An assay method for an active enzyme which comprises contacting an aqueous solution of said enzyme with a compound of formula (I) of claim **1**, detecting the D-aminoluciferin produced, and calculating the enzyme concentration.

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**5,036,000**

## THRESHOLD COLOR CONTROL SYSTEM

**John L. Palmer, Philadelphia, and Marsha W. Timmerman, Allentown, both of Pa., assignors to Enzymatics, Inc., Horsham, Pa.**

**Continuation-in-part of Ser. No. 942,414, Dec. 16, 1986. This application Jul. 20, 1987, Ser. No. 75,817**

**Int. Cl.[5] C12Q** *1/32, 1/54;* **C12M** *1/40*

**U.S. Cl. 435—26** **85 Claims**

**72.** A diagnostic colorimetric device for determination of the concentration of NAD(P)H, NAD(P), or an analyte which reacts to form or consume NAD(P)H, wherein the device comprises:

a physical support means,

a chromogen which is capable of accepting electrons from NAD(P)H and which produces a color change upon reduction by NAD(P)H,

a non-chromogenic competing reactant which is capable of accepting electrons from NAD(P)H, in an amount sufficient to prevent a visible color change due to accumulation of reduced chromogen until a predetermined threshold amount of NAD(P)H is exceeded,

an electron-carrier catalyst capable of transferring electrons from NAD(P)H to the chromogen,

NAD(P), and

an NAD(P)-dependent dehydrogenase capable of oxidizing the analyte to produce NAD(P)H in an amount proportional to the analyte,

wherein the physical support means has a series of defined areas, each area containing a different pre-selected concentration of the non-chromogenic competing reactant and wherein each pre-selected concentration of non-chromogenic competing reactant is capable of preventing a visible color change due to accumulation of reduced chromogen until a predetermined threshold amount of NAD(P)H is exceeded.

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5,036,001

## METHOD FOR SUPPLYING FOODSTUFF SAMPLES FOR MICROBIOLOGICAL TESTING

**Fritz-Peter Gork, Hattersheim; Klaus-Dieter Müller, Riedstadt, and Doris Schweitzer, Wallau, all of Fed. Rep. of Germany, assignors to Lufthansa Service GmbH, Fed. Rep. of Germany**

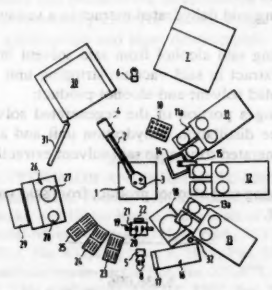
**PCT No. PCT/EP88/00261, § 371 Date Jan. 19, 1989, § 102(e) Date Jan. 19, 1989, PCT Pub. No. WO88/07710, PCT Pub. Date Oct. 6, 1988**

**PCT Filed Mar. 29, 1988, Ser. No. 328,589**

**Claims priority, application Fed. Rep. of Germany, Mar. 31, 1987, 3710663; Jun. 23, 1987, 3720733**

**Int. Cl.[5] C12Q *1/00*; B25J *11/00***

**U.S. Cl. 435—31** **14 Claims**



1. Method for supplying a foodstuff sample for microbiological testing, comprising supplying the sample in a plastic bag, adding physiological nutrient solution to the sample in the plastic bag in a specified weight ratio, mechanically comminuting and homogenizing the contents of the bag, removing a partial quantity of the contents of the bag by means of a pipette via a filter as sample liquid, injecting the sample liquid onto at least one nutrient medium situated in a petri dish, and inserting the injected petri dish into an incubator; said method further comprising, in the comminution and homogenization of the contents of the bag, clamping the plastic bag shut and pressing the plastic bag between a fixed jaw and two jaws which oscillate alternately; in the injection of the nutrient medium, injecting the sample liquid out in a spiral shape onto the nutrient medium; employing a laboratory robot system including a laboratory robot to carry out all handling processes by means of a mechanical hand; and controlling the robot and all participating laboratory apparatus with a control unit programmed according to a sequence of examination.

5,036,002

## EXPRESSION SYSTEM WITH TRANS-ACTING DNA SEGMENTS

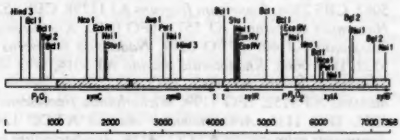
**Sven Hastrup, Copenhagen, Denmark, assignor to Novo-Nordisk A/S, Denmark**

**Filed May 17, 1987, Ser. No. 39,298**

**Claims priority, application Denmark, Apr. 17, 1986, 1777/86**

**Int. Cl.[5] C12P *21/06, 19/34*; C12N *15/00, 1/22***

**U.S. Cl. 435—69.1** **13 Claims**



1. A gene expression system comprising an expression vector having one or more negatively regulated promoter-operators, each operably linked to a gene to be expressed, said promoter-operators being under the control of a repressor protein encoded by a repressor gene, wherein said repressor gene is present on said expression vector or on a second expression vector, wherein said promoter-operators and repressor gene are derived from a Bacillus species, and wherein said repressor gene is xyl R and said promoter-operators are selected from the group consisting of xyn C, xyn B and xyl A, xyl B.

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5,036,003

## ANTIBODIES TO VPF

**Jitka V. Olander, University City; Daniel T. Connolly, Manchester; Steven P. Adams, St. Charles, and Joseph Feder, University City, all of Mo., assignors to Monsanto Company, St. Louis, Mo.**

**Continuation-in-part of Ser. No. 87,739, Aug. 21, 1987, Pat. No. 5,008,196. This application Sep. 2, 1988, Ser. No. 240,780**

**Int. Cl.[5] C12P *21/00, 21/08***

**U.S. Cl. 435—70.1** **4 Claims**

1. A method of producing antibodies which block the permeability-enhancing and growth-promoting activities of vascular permeability factor (VPF) comprising immunizing an animal host with a synthetic peptide having an amino acid sequence as follows:

1 5 10 15
AlaProMetAlaGluGlyGluGlnLysProArgGluValValLys.

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5,036,004

## PROCESS FOR PRODUCING L-SERINE

**Eiji Majima; Hiroaki Takino, both of Kawasaki; Kunisuke Izawa, Yokohama; Kenzo Yokozeki, and Koji Kubota, both of Kawasaki, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan**

**Continuation of Ser. No. 813,557, Dec. 26, 1985, abandoned. This application May 5, 1989, Ser. No. 348,112**

**Claims priority, application Japan, Dec. 27, 1984, 59-281339; May 8, 1985, 60-96895; May 8, 1985, 60-96896; Jul. 17, 1985, 60-157153**

**Int. Cl.[5] C82P *13/06*; C17N *1/12, 1/14***

**U.S. Cl. 435—116** **7 Claims**

1. A process for producing L-serine, comprising:

reacting a microorganism capable of producing L-serine from L-2-oxo-oxazolidine-4-carboxylic acid or a salt thereof, with L-2-oxo-oxazolidine-4-carboxylic acid or salt thereof in a culture medium to produce L-serine, wherein said microorganism is selected from the group consisting of *Alcaligenes faecalis* AJ 2541, FERM-P 8030, FERM-BP 940, *Arthrobacter globiformis* AJ 1422, ATCC 8010, *Bacillus subtilis*, AJ 1992, ATCC 13952, *Cellulomo-*

*nas flavigena* AJ 1568, ATCC 491, *Corynebacterium hydrocarboclastus* FERM-P 1097, *Flavobacterium aquatile* AJ 2135, ATCC 8375, *Jensenia canicruria* AJ 3147, ATCC 11048, *Mycobacterium ammoniaphilum* AJ 1977, ATCC 15354, *Micrococcus roseus* AJ 1006, ATCC 9815, *Rhodococcus erythropolis* AJ 9126, ATCC 4277, *Pseudomonas testosteroni* AJ 2270, ATCC 17409, *Pseudomonas acidovorans* AJ 3117, ATCC 15668, *Candida zeylanoides* AJ 4677, IFO 0719, *Citeromyces matritensis* AJ 4287, CBS 2764, *Cryptococcus laurentii* AJ 5225, IFO 0609, *Debaryomyces hansenii* AJ 4179, IFO 0023, *Endomycopsis oventensis* AJ 5062, CBS 2508, *Geotricum fragrans* AJ 14298, CBS 15225, *Hansenula californica* AJ 5573, IFO 0800, *Kluyveromyces marxianus* AJ 4074, IFO 0219, *Nadosonia falvescens* AJ 5332, IFO 0666, *Rhodotorula marina* AJ 5014, IFO 0879, *Torulopsis famata* AJ 4342, IFO 0623, *Trichosporon fermentans* AJ 5152, IFO 1199, *Wickerhamia fluorescens* AJ 4285, IFO 1116, *Achromobacter viscosus* ATCC 12448, *Aeromonas salmonicida* ATCC 14174, *Agrobacterium radiobacter* ATCC 6466, *Azotobacter vinelandii* ATCC 9046, *Brevibacterium pusillum* ATCC 19096, *Escherichia coli* ATCC 13071, *Klebsiella pneumonia* ATCC 8329, *Kluyvera non-citrophila* FERM-P 3150, *Kurthina zophii* ATCC 6900, *Mycoplana dimorpha* ATCC 4279, *Proteus rettgeri* FERM-P 8196, FERM-BP 941, AJ 2770, *Salmonella schottmuelleri* ATCC 8759, *Serratia marcescens* ATCC 14225, *Streptomyces humifer* FERM-P 2347, *Vibrio-tyrogenes* ATCC 7085, *Xanthomonas campestris* ATCC 7381, *Pichia membranaefaciens* IFO 0406, *Saccharomyces fermentati* IFO 0422, *Tremella brasiliensis* IFO 9289, *Alternaria cucumerina* IFO 7417, *Curvularia geniculata* ATCC 6671, *Fusarium nivale* ATCC 42308, *Helminthosporium gramineum* ATCC 6695, *Phoma destructiva* ATCC 24636, *Sclerotium bataticola* ATCC 12265, *Cochliobolus miyabeanus* IFO 5844, *Mucor circinelloides* ATCC 8770, *Aspergillus repens* ATCC 5817, *Penicillium decumbens* ATCC 10436, *Gromerella cingulata* ATCC 11326, *Septoria glycines* ATCC 38699, *Pseudoplea trifolii* IFO 7252, *Stemphylium astragali* IFO 7244, *Diplodia natalensis* ATCC 34643, *Stachylidium bicolor* ATCC 12672, *Eupenicillium alutaceum* ATCC 18542, *Anixiella reticulata* ATCC 34511, *Arachniotus flavoluteus* ATCC 18430, *Byssochlamys fulva* ATCC 10099, *Coniochaeta tetraspora* ATCC 22275, *Golasinospora longispora* ATCC 18493, *Gymnoascus umbrinus* IFO 8358, *Microascus cinereus* ATCC 16594, *Microthecium retisporum* ATCC 22184, *Sordaria humana* ATCC 22796, *Sporormiella isomera* ATCC 24341, *Toxotrichum cancellatum* ATCC 15316 and *Melanospora zamiae* ATCC 12340; and

obtaining L-serine from said medium.

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**5,036,005**

## ALCOHOL RECOVERY BY CONTINUOUS FERMENTATION

**Daniel W. Tedder, Marietta, Ga., assignor to Georgia Tech Research Corporation, Atlanta, Ga.**

**Continuation-in-part of Ser. No. 54,037, May 22, 1987, abandoned, which is a continuation of Ser. No. 764,393, Aug. 12, 1985, abandoned. This application Jan. 17, 1989, Ser. No. 298,216**

**Int. Cl.**[5] **C12P** *7/06, 7/14, 7/04, 7/16*

**U.S. Cl. 435—161** **26 Claims**

1. A process of producing alcohol comprising:

(a) feeding a sugar and water containing feed stock to a fermenter;

(b) providing the fermenter with fermentation microorganisms and operating the fermenter continuously for converting the feed stock into a fermentation product containing alcohol, sugar and microorganisms;

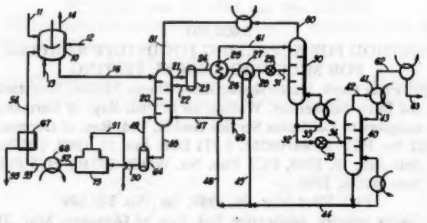
(c) feeding the fermentation product to a solvent extraction column;

(d) delivering to said solvent extraction column solvent which is non-toxic to the fermentation microorganisms which will dissolve and decrease the volatility of said alcohol relative to said water such that said water is more volatile than said alcohol in the presence of said solvent and said solvent is less volatile than either said water or said alcohol in ternary mixtures of said solvent, said water and said alcohol, said solvent being and is essentially immiscible in the water in the fermentation product for liquid to liquid extraction of the alcohol for providing an alcohol-solvent extract phase and a water phase, the water phase including microorganisms, solids and water;

(e) removing alcohol-solvent extract phase from said solvent extraction column and directing the alcohol-solvent extract phase to an extractive distillation dehydration unit;

(f) removing water phase from said solvent extraction column and returning the water phase to said fermenter;

(g) distilling in said extractive distillation dehydration unit the bulk of the residual water from said alcohol-solvent extract phase leaving a dehydrated extract including alcohol and solvent;



(h) returning the distilled water from said extractive distillation dehydration unit to the solvent extraction column to provide more efficient liquid/liquid extraction of the alcohol from the fermentation product in said solvent extraction column;

(i) delivering said dehydrated extract to a vacuum stripping unit;

(j) separating said alcohol from said solvent in said dehydrated extract in said vacuum stripping unit to produce regenerated solvent and alcohol product;

(k) returning a portion of the regenerated solvent to said extractive distillation dehydration unit and a portion of the regenerated solvent to said solvent extraction column; and

(l) discharging said alcohol product from said vacuum stripping unit.

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**5,036,006**

## METHOD FOR TRANSPORTING SUBSTANCES INTO LIVING CELLS AND TISSUES AND APPARATUS THEREFOR

**John C. Sanford, Geneva; Edward D. Wolf, Ithaca, and Nelson K. Allen, Newfield, all of N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.**

**Continuation of Ser. No. 877,619, Jun. 23, 1986, abandoned, Continuation-in-part of Ser. No. 670,771, Nov. 13, 1984, Pat. No. 4,945,050. This application Aug. 17, 1989, Ser. No. 394,899**

**The portion of the term of this patent subsequent to Jul. 31, 2007, has been disclaimed.**

**Int. Cl.**[5] **C12N** *15/00, 5/00, 1/00, 7/00*

**U.S. Cl. 435—172.1** **13 Claims**

1. A method for introducing particles into cells comprising accelerating particles having a diameter sufficiently small to penetrate and be retained in a preselected cell without killing the cell, and propelling said particles at said cells whereby said particles penetrate the surface of said cells and become incorporated into the interior of said cells wherein the cells are cells of monocot plants.

5,036,007

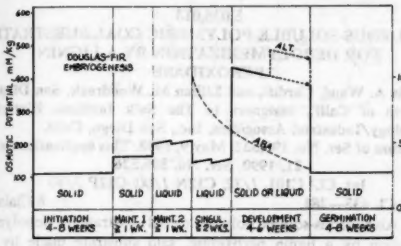
## METHOD FOR REPRODUCING CONIFEROUS PLANTS BY SOMATIC EMBRYOGENESIS USING ABSCISIC ACID AND OSMOTIC POTENTIAL VARIATION

Pramod K. Gupta, Federal Way, and Gerald S. Pullman, Renton, both of Wash., assignors to Weyerhaeuser Company, Tacoma, Wash.

Continuation-in-part of Ser. No. 321,035, Mar. 9, 1989, Pat. No. 4,957,866, and a continuation-in-part of Ser. No. 426,331, Oct. 23, 1989. This application Mar. 26, 1990, Ser. No. 499,151

Int. Cl.[5] A01H *4/00, 7/00;* C12N *5/04*

U.S. Cl. 435—240.45 26 Claims




1. A method suitable for further developing tissue culture induced coniferous plant species somatic proembryos into well developed cotyledonary embryos which comprises:

transferring and further culturing the proembryos using a development medium having sufficient amounts of mineral and organic nutrient materials along with a sufficient initial amount of abscisic acid and an adsorbent material to gradually reduce the level of available abscisic acid over time, said medium also having sufficient osmoticants to raise the osmotic potential to at least about 350 mM/kg, so as to enable and promote the development and growth of robust cotyledonary embryos having a high potential for normal germination and plant development.

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5,036,008

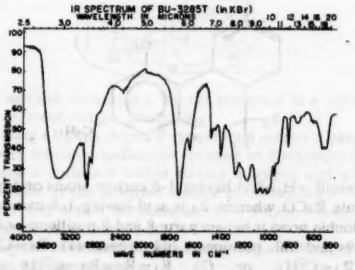
## ANTITUMOR ANTIBIOTIC BU-3285T

Hiroaki Ohkuma; Koji Tomita, both of Tokyo; Masataka Konishi, Kawasaki, and Hideo Kamei, Tokyo, all of Japan, assignors to Bristol-Myers Company, New York, N.Y.

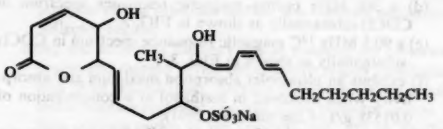
Division of Ser. No. 431,423, Nov. 3, 1989, Pat. No. 4,952,709, which is a continuation-in-part of Ser. No. 378,677, Jul. 12, 1989, abandoned. This application Apr. 11, 1990, Ser. No. 507,543

Int. Cl.[5] C12N *1/00;* C12P *17/00;* C07P *309/32*

U.S. Cl. 435—252.1 2 Claims




1. A process for producing BU-3285T having the formula




which comprises cultivating *Chainia rosea* having all of the identifying characteristics of ATCC-53903 or a BU-3285T-producing mutant thereof under submerged aerobic conditions in an aqueous nutrient medium containing assimilable sources of carbon and nitrogen until a substantial amount of BU-3285T is produced by said organism in said culture medium and then recovering the BU-3285T from the culture medium substantially free of co-produced substances.

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5,036,009

## BIOCHEMICAL PROCESS

Stephen C. Taylor, Clwyd, Wales, assignor to Imperial Chemical Industries PLC, London, England

Division of Ser. No. 433,093, Oct. 6, 1982. This application Dec. 31, 1984, Ser. No. 687,935

Claims priority, application United Kingdom, Oct. 6, 1981, 8130116

The portion of the term of this patent subsequent to Apr. 2, 2002, has been disclaimed.

Int. Cl.[5] C12N *1/20, 1/26, 15/00;* C12P *1/26*

U.S. Cl. 435—253.3 1 Claim

1. A biologically pure culture of *Pseudomonas putida* NCIB 11767.

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5,036,010

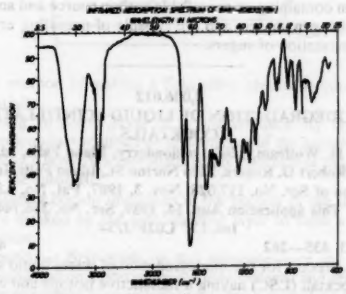
## BMY-40800 ANTITUMOR ANTIBIOTICS

King S. Lam, Cheshire; Jacqueline Mattei, East Haven; John E. Leet; James A. Matson, both of Cheshire, all of Conn.; Koji Tomita, Tokyo, Japan, and Murray A. Kaplan, Syracuse, N.Y., assignors to Bristol-Myers Company, New York, N.Y.

Division of Ser. No. 155,778, Feb. 16, 1988, Pat. No. 4,994,271. This application Apr. 26, 1990, Ser. No. 515,006

Int. Cl.[5] C12N *1/20*

U.S. Cl. 435—253.5 1 Claim




1. A biologically pure culture of the microorganism *Streptomyces hygroscopias* having all of the identifying characteristics of ATCC 53653, said culture being capable of producing the compound BMY-40800 having the following characteristics:

(a) a white crystalline solid containing the elements carbon, hydrogen, oxygen, and nitrogen in approximately the following percentages: C, 58.16; H, 6.94; N, 12.84; and O (by difference), 22.26;

(b) an infrared absorption spectrum (KBr) substantially as shown in FIG. 1;

(c) a molecular formula of $C_{72}H_{104}N_{14}O_{20}$;
(d) a 360 MHz proton magnetic resonance spectrum in $CDCl_3$ substantially as shown in FIG. 3;
(e) a 90.5 MHz $^{13}C$ magnetic resonance spectrum in $CDCl_3$ substantially as shown in FIG. 3;
(f) exhibits an ultraviolet absorption maximum and absorptivity when dissolved in methanol at a concentration of 0.01538 g/l of 286 nm (a=0.2891);
(g) an apparent molecular weight by FAB mass spectrometry of about 1484;
(h) exhibits in silica gel thin layer chromatography an Rf value of 0.35 with the solvent system chloroform:methanol (95:5 v/v);
(i) exhibits a high performance liquid chromatography retention time of 15 of minutes and a capacity factor K'=8.9 with a $C_{18}$ reversed phase silica gel column and the solvent system acetonitrile:tetrahydrofuran:water (4:1:5 v/v); and
(j) is effective in inhibiting the growth of P388 leukemia in mice;

in a recoverable quantity upon aerobic cultivation in an aqueous nutrient medium containing assimilable sources of carbon and nitrogen.

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**5,036,011**

## NOVEL AUREOBASIDIUM SP. MICROORGANISMS AND METHOD FOR OBTAINING THE SAME, AND METHOD FOR PREPARING ERYTHRITOL WITH THE SAME

**Takashi Sasaki; Takafumi Kasumi; Naoya Kubo; Keiji Kainuma, all of Ibaraki; Katsuo Wako, Gyoda; Hiroaki Ishizuka, Ibaraki; Gaku Kawaguchi, Gyoda, and Tsunero Oda, Akikawa, all of Japan, assignors to Director of National Food Research Institute, Ministry of Agriculture, Forestry and Fisheries, Ibaraki and Nikken Chemicals Co., Ltd., Tokyo, both of, Japan**

**Division of Ser. No. 88,858, Aug. 24, 1987, Pat. No. 4,939,091. This application Apr. 5, 1990, Ser. No. 504,938**
**Claims priority, application Japan, Sep. 9, 1986, 61-210669; Feb. 6, 1987, 62-24716**
**Int. Cl.[5] C12N *1/16, 15/00;* C12P *7/18;* C12R *1/645***
**U.S. Cl. 435—255** **4 Claims**

1. A biologically pure culture of *Aureobasidium* sp. SN-124A strain (FERM BP-1429) and artificial mutants thereof, which have the properties of forming and accumulating erythritol in a culture solution when aerobically cultured on a liquid culture medium containing an assimilable carbon source and an assimilable nitrogen source, and are capable of preparing erythritol by fermentation of sugars.

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**5,036,012**

## BIODEGRADATION OF LIQUID SCINTILLATION COCKTAILS

**James H. Wolfram, 1263 Londonderry, Idaho Falls, Id. 83404, and Robert D. Rogers, 1206 Norton St., Idaho Falls, Id. 83402**

**Division of Ser. No. 117,028, Nov. 3, 1987, Pat. No. 4,863,872. This application Aug. 14, 1989, Ser. No. 366,744**
**Int. Cl.[5] C02F *3/34***
**U.S. Cl. 435—262** **4 Claims**

1. A process for the biodegradation of waste liquid scintillation cocktail (LSC) having a radioactive isotope and comprising from about 50% to about 90% organic solvent compounds selected from the group consisting of p-xylene, 1-, 2-, 4-trimethyl benzene (pseudocumene), benzene, and toluene and from about 10% to about 50% emulsifier, the process comprising the steps of:
a. introducing a metabolically acceptable mineral salts media into a bioreactor;
b. inoculating the bioreactor with an effective amount of microorganism Pseudomonas sp NRRL B-18435 capable of metabolizing the organic solvent compounds and capable of withstanding the toxic effects of the emulsifier;
c. introducing organic solvent compounds into the bioreactor and maintaining the concentration of organic solvent compounds therein at a level sufficient to supply the microorganism with a sole and adequate carbon source, and below the toxic limit of organic solvent compounds;
d. agitating and aerating the mixture of mineral salts media, microorganism and organic solvent compound; and
e. maintaining the bioreactor at conditions of temperature, pH, and microorganism cell density sufficient to maintain the microorganism in the bioreactor in a steady state condition.

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**5,036,013**

## AQUEOUS-SOLUBLE POLYMERIC COAL SUBSTRATE FOR DEPOLYMERIZATION BY A LIGNIN PEROXIDASE

**Willis A. Wood, Cardiff, and Lillian M. Wondrack, San Diego, both of Calif., assignors to The Salk Institute Biotechnology/Industrial Associates, Inc., San Diego, Calif.**

**Division of Ser. No. 193,332, May 9, 1988. This application Sep. 21, 1990, Ser. No. 586,526**
**Int. Cl.[5] C10L *1/32;* C12N *1/00;* C12P *7/40***
**U.S. Cl. 435—281** **8 Claims**

1. An aqueous-soluble polymeric coal substrate for depolymerization by a lignin peroxidase, said substrate made by a method comprising;
(a) oxidizing a coal powder with nitric acid at a temperature between about 15° C. and about 70 ° C.;
(b) suspending the nitric acid-oxidized coal powder of step (a) in an aqueous solution comprising an alkali metal hydroxide at a concentration to provide a pH of at least about 10;
(c) separating solids from the supernatant phase of the suspension of step (b);
(d) acidifying the supernatant from (c) to a pH between 2.5 and 3.5 with a strong acid selected from the group consisting of HCl, HBr, $HNO_3$ and $H_2SO_4$; and
(e) extracting the precipitate of step (d) with an aqueous solution with an ionic strength of less than 0.15 molal.

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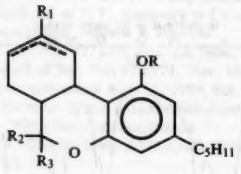
**5,036,014**

## DEUTERATED CANNABINOIDS AS STANDARDS FOR THE ANALYSIS OF TETRAHYDROCANNABINOL AND ITS METABOLITES IN BIOLOGICAL FLUIDS

**Mahmoud A. ElSohly, 41 Shelia Dr., and Thomas L. Little, Jr., P.O. Box 1737, both of Oxford, Miss. 38655**

**Filed Jan. 31, 1989, Ser. No. 306,292**
**Int. Cl.[5] G01N *24/00***
**U.S. Cl. 436—8** **8 Claims**

1. Deuterated cannabinoids having the following formula:

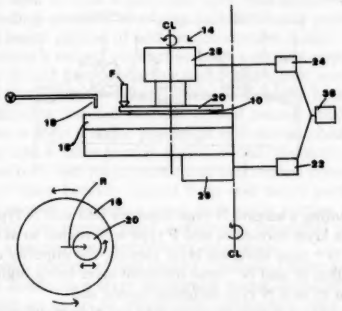



wherein R=H, alkyl having 1–8 carbon atoms or acyl of the formula $R_4CO$ wherein $R_4$ is acyl having 1–8 carbon atoms, the double bond is between the 8 and 9 positions, or between the 9 and 10 positions, and where (1) $R_1=CH_3$ and $R_2=R_3=C^2H_3$, or (2) $R_1=R_2=R_3=C^2H_3$, or (3) $R_1=CH_2OH$, $C^2H_2OH$ or COOH and $R_2=R_3=C^2H_3$.

## 5,036,015
## METHOD OF ENDPOINT DETECTION DURING CHEMICAL/MECHANICAL PLANARIZATION OF SEMICONDUCTOR WAFERS

Gurtej S. Sandhu; Laurence D. Schultz, and Trung T. Doan, all of Boise, Id., assignors to Micron Technology, Inc., Boise, Id.

Filed Sep. 24, 1990, Ser. No. 586,996
Int. Cl.[5] H01L *21/66*
U.S. Cl. 437—8 11 Claims




1. A method for mechanically planarizing a semiconductor wafer comprising:

a. holding the wafer in contact with a polishing platen in the presence of a chemical slurry;

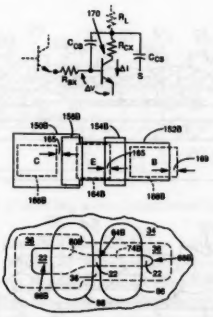
b. rotating the wafer with respect to and against the polishing platen; and

c. sensing a change in friction between the wafer and the polishing platen to detect a planar endpoint on the wafer.

## 5,036,016
## VLSI BIPOLAR TRANSISTOR PROCESS

Robert M. Drosd, Aloha, Oreg., assignor to Bipolar Integrated Technology, Inc., Beaverton, Oreg.

Filed Feb. 21, 1989, Ser. No. 315,356
Int. Cl.[5] H01L *21/265*
U.S. Cl. 437—31 20 Claims




1. A method of making a bipolar transistor in a very large scale integrated circuit, comprising:

providing a lightly doped P-type silicon substrate having an upper substrate surface for forming an integrated circuit;

forming a collector region having a length and a width bounded at the substrate surface by an insulative surface layer and within the substrate by a P-type channel stop beneath the insulative layer;

doping the substrate in the collector region to a first depth with N-type dopant;

masking and patterning an area encompassing the collector region so as to define a pair of spaced openings wherein portions of the substrate surface are exposed within the collector region;

sizing and arranging the openings to transsect the collector region and thereby divide the collector region lengthwise into three spaced-apart, covered regions including a collector contact region at one end of the collector region, a base contact region at the opposite end, and an emitter region spaced between the collector contact and base contact regions;

forming low resistivity regions in the portions of substrate exposed within said openings, including an N-type low resistivity region between the collector contact and emitter regions and a P-type low resistivity region between the base contact and emitter regions; and

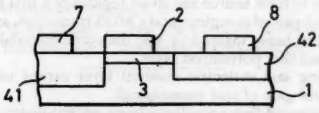
forming an NPN bipolar transistor by successive diffusion of a P-type base and N-type emitter in the emitter region and forming contacts in the collector and base contact and emitter regions;

the step of forming the collector region including sizing a first lengthwise end portion to a first width and a second, opposite end portion to a second width less than the first width and the masking and patterning step including positioning the collector contact region and adjoining opening over said first end portion so that the collector contact region and a portion of the N-type low resistivity region are formed with a width corresponding to the first width independently of the second width, whereby the width of the collector contact region is greater than the width of the emitter region.

## 5,036,017
## METHOD OF MAKING ASYMMETRICAL FIELD EFFECT TRANSISTOR

Minoru Noda, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Nov. 27, 1989, Ser. No. 441,898
Claims priority, application Japan, Nov. 29, 1988, 63-302531
Int. Cl.[5] H01L *21/265, 21/44, 29/22, 29/78*
U.S. Cl. 437—41 16 Claims




1. A method of making a field effect transistor comprising sequentially:

forming an active layer of a first conductivity type in a semiconductor substrate at a surface of the substrate;

forming a layer of a gate material on a portion of the surface of the substrate;

implanting dopant impurities in the portion of the substrate not masked by the gate material layer to form a source region;

depositing a first mask on the substrate over the source region and on a portion of the gate material and removing the unmasked gate material to define a gate electrode and expose the surface of the substrate adjoining the gate electrode at the side of the gate electrode opposite the source region;

forming a second mask on a portion of the exposed surface of the substrate adjacent to the gate electrode at the side of the gate electrode that is opposite the source region;

implanting dopant impurities in the portion of the substrate not masked by the first and second masks to form a drain region whereby the gate electrode is asymmetrically disposed relative to the source and drain regions; and

removing the first and second masks and forming source and

drain electrodes on the source and drain regions, respectively.

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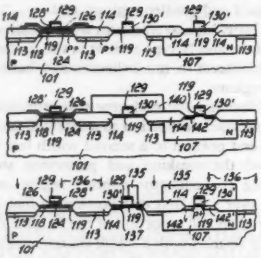
**5,036,018**

## METHOD OF MANUFACTURING CMOS EPROM MEMORY CELLS

**Stefano Mazzali, Milan, Italy, assignor to SGS-Thomson Microelectronics S.p.A., Catania, Italy**

**Filed Jul. 25, 1988, Ser. No. 224,102**
**Claims priority, application Italy, Jul. 31, 1987, 21536 A/87**
**Int. Cl.[5] H01L *21/265***
**U.S. Cl. 437—43** **14 Claims**



1. A method for manufacturing in a substrate an EPROM memory cell having self-aligned floating and control gates and a pair of complementary MOS transitors, comprising, in sequence, the steps of:

forming an oxide layer on the surface of said substrate,

depositing a first polysilicon layer on said oxide layer at least at the substrate region wherein the memory cell is to be formed,

forming a dielectric material layer at least over said polysilicon layer,

depositing a second polysilicon layer

shaping said second polysilicon layer to form the control gate of said memory cell and the gate regions of said CMOS transistors,

selectively introducing first doping impurities into said substrate to form source and drain regions of a first transistor of said pair of complementary MOS transistors, said memory cell being masked by said dielectric material layer or by said first polysilicon layer,

removing said dielectric material layer except under said control gate of said memory cell,

removing said first polysilicon layer, except under said control gate of said memory cell, thereby shaping said floating gate of said memory cell,

selectively introducing second doping impurities into said substrate to form source and drain regions of a second transistor of said pair of complementary MOS transistors and source and drain regions of the memory cell.

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**5,036,019**

## METHOD OF PRODUCING A COMPLEMENTARY-TYPE SEMICONDUCTOR DEVICE

**Hiroyuki Yamane, Anjo, and Yasushi Higuchi, Kariya, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Jun. 13, 1990, Ser. No. 537,688**
**Claims priority, application Japan, Jun. 16, 1989, 1-155511**
**Int. Cl.[5] H01L *21/266***
**U.S. Cl. 437—57** **12 Claims**

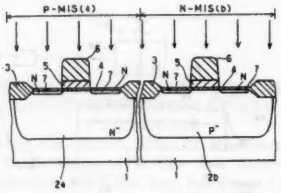
1. A method of producing a complementary-type semiconductor device comprising the steps of:

forming a P type well region and an N type well region in a semiconductor substrate;

forming an insulating film covering the surface of said P type and said N type well regions;

forming a first gate electrode and a second gate electrode on said insulating film over said P type and said N type well regions respectively, said first gate electrode being provided with a channeling block layer thereon;

implanting a first N type impurity into areas of said P type and N type well regions which are respectively located around said first and said second gate electrodes so as to form N type diffusion layers in said areas, wherein said channelling block layer is used as a mask for preventing said first N type impurity from channelling into said first gate electrode;



implanting a second N type impurity into said N type diffusion layer formed in said P type well region so as to form an $N^+$ type diffusion layer therein, the impurity concentration of said $N^+$ type diffusion layer being higher than that of said N type diffusion layers; and

implanting a P type impurity into the N type diffusion layer formed in said N type well region so as to form a $P^+$ type diffusion layer therein, the impurity concentration of said $P^+$ type diffusion layer being higher than that of said N type diffusion layers.

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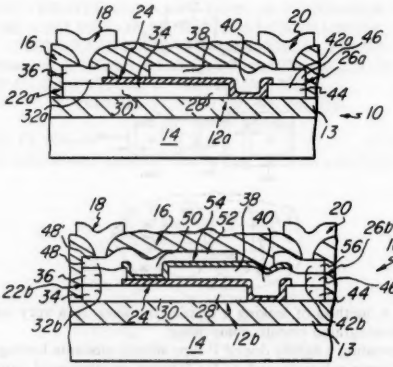
**5,036,020**

## METHOD OF FABRICATING MICROELECTRONIC DEVICE INCORPORATING CAPACITOR HAVING LOWERED TOPOGRAPHICAL PROFILE

**Howard L. Tigelaar, Allen, Tex., assignor to Texas Instrument Incorporated, Dallas, Tex.**

**Filed Aug. 31, 1990, Ser. No. 576,257**
**Int. Cl.[5] H01L *21/70***
**U.S. Cl. 437—60** **6 Claims**



1. A method for forming a microelectronic device incorporating a capacitor having a lowered topographical profile, the method comprising the steps of:

(a) providing a substrate;

(b) forming a first conductive layer;

(c) removing selected portions of said first conductive layer to form a major portion of said first conductive layer and

a minor portion of said first conductive layer therefrom, said major portion of said first conductive layer being laterally spaced from said minor portion of said first conductive layer, said major portion of said first conductive layer including a functional portion and a first conductive layer subportion;

(d) forming a thin conformal insulation layer over said major portion of said first conductive layer and said minor portion of said first conductive layer;

(e) removing selected portions of said thin conformal insulation layer to form a dielectric layer, said dielectric layer including portions overlying said functional portion of said major portion of said first conductive layer;

(f) forming a second conductive layer over said major portion of said first conductive layer, said minor portion of said first conductive layer, and said dielectric layer;

(g) removing selected portions of said second conductive layer to form a major portion of said second conductive layer and a minor portion of said second conductive layer therefrom, said major portion of said second conductive layer being laterally spaced from said minor portion of said second conductive layer, said major portion of said second conductive layer including a functional portion and a second conductive layer subportion,

said minor portion of said second conductive layer and said first conductive layer subportion being intimately connected so as to be electrically conductive, said minor portion of said first conductive layer and said second conductive layer subportion being intimately connected so as to be electrically conductive, said functional portion of said major portion of said second conductive layer directly overlying said dielectric layer and said functional portion of said major portion of said first conductive layer.

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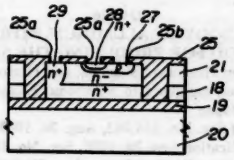
**5,036,021**

## METHOD OF PRODUCING A SEMICONDUCTOR DEVICE WITH TOTAL DIELECTRIC ISOLATION

**Hiroshi Goto, Kawasaki, Japan, assignor to Fujitsu Limited, Kanagawa, Japan**

**Filed Oct. 18, 1988, Ser. No. 259,558**
**Claims priority, application Japan, Oct. 19, 1987, 62-263345**
**Int. Cl.[5] H01L *21/76***
**U.S. Cl. 437—62** **9 Claims**




1. A method of producing a semiconductor device comprising the steps of:

preparing a stacked structure having an n-type semiconductor substrate having a first impurity concentration, an n-type first layer having a second impurity concentration higher than said first impurity concentration formed on said n-type semiconductor substrate and an insulation layer formed on said n-type first layer;

adhering a base substrate on said insulation layer;

removing said n-type semiconductor substrate in its entirety by an etching, said etching having a higher etching rate for said n-type semiconductor substrate than for said n-type first layer;

forming an n-type second layer having a third impurity concentration lower than said second impurity concentration on said n-type first layer by an epitaxial growth;

selectively forming a groove which extends from a surface of said n-type second layer to said insulation layer;

filling an insulator in said groove; and

forming at least one element in said n-type second layer which constitutes an active layer.

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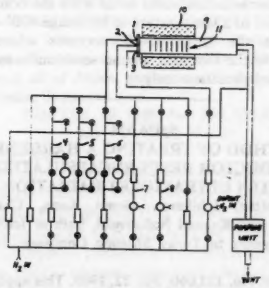
**5,036,022**

## METAL ORGANIC VAPOR PHASE EPITAXIAL GROWTH OF GROUP III-V SEMICONDUCTOR MATERIALS

**Thomas F. Kuech, Peekskill, and Michael A. Tischler, Jefferson Valley, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Continuation of Ser. No. 215,181, Jul. 5, 1988, abandoned. This application Nov. 1, 1990, Ser. No. 607,846**
**Int. Cl.[5] H01L *21/20***
**U.S. Cl. 437—81** **35 Claims**



8. A method for epitaxially growing a III-V compound semiconductor on a substrate comprising:

(a) positioning in a hot wall reaction chamber at least one substrate of a material having a surface suitable for epitaxial growth;

(b) introducing into said hot wall reaction chamber a gaseous mixture including at least one organometallic halide compound of a Group III metal and at least one compound of a Group V element under conditions of suitable temperature and pressure; and

(c) depositing on said at least one substrate an epitaxial layer of at least one III-V compound semiconductor.

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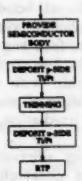
**5,036,023**

## RAPID THERMAL PROCESSING METHOD OF MAKING A SEMICONDUCTOR DEVICE

**William C. Dautremont-Smith, Westfield; Avishay Katz, Cranford; Louis A. Koszi, Scotch Plains; Bryan P. Segner, Piscataway, and Peter M. Thomas, Berkeley Heights, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Aug. 16, 1989, Ser. No. 394,600**
**Int. Cl.[5] H01L *21/44***
**U.S. Cl. 437—184** **5 Claims**




1. A method of making an article comprising a semiconductor device, the method comprising

a) providing a semiconductor body that comprises a p-doped first semiconductor material comprising both In and As,

and that further comprises a n-doped second semiconductor material, the first and second semiconductor materials forming a first and a second surface of the body, respectively;

b) depositing a first conductor layer on the first surface and a second conductor layer on the first conductor layer, the first and second conductor layers comprising Ti and Pt, respectively;

c) heat treating the semiconductor body with the conductor layers thereon; and

d) completing making the article;

CHARACTERIZED IN THAT the method further comprises

e) depositing, prior to c), a third conductor layer on the second surface and a fourth conductor layer on the third conductor layer, the third and fourth conductor layers comprising Ti and Pt, respectively; and c) comprises a "rapid thermal processing" (RTP) step that comprises heating the semiconductor body with the conductor layers thereon to a temperature in the range 400°-500° C. for a time in the range 10-100 seconds whereby ohmic contacts to the first and second semiconductor materials are formed simultaneously.

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**5,036,024**

## METHOD OF TREATING A HARDENED SEMICONDUCTOR RESIN ENCAPSULATED LAYER WITH ULTRAVIOLET RADIATION

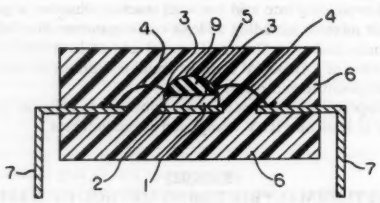
**Katsutoshi Mine, Ichihara; Akemi Kogo, Chiba; Kimio Yamakawa, and Kazumi Nakayoshi, both of Ichihara, all of Japan, assignors to Toray Silicone Company, Inc., Tokyo, Japan**

**Division of Ser. No. 223,060, Jul. 22, 1988. This application Sep. 10, 1990, Ser. No. 580,054**

**Claims priority, application Japan, Jul. 22, 1987, 62-183974**

**Int. Cl.[5] H01L *21/56***

**U.S. Cl. 437—211** **4 Claims**




1. A method of manufacturing a resin sealed semiconductor device characterized by the fact that at least one semiconductor chip of a semiconductor device is electrically connected to lead wires for external connections by means of electrically conductive connections,

covering a surface of said chip and at least a portion of said electrically conductive connections in proximity to said semiconductor chip with a hardenable self-bonding silicone composition,

hardening said hardenable self-bonding silicone composition forming a hardened silicone layer being adhered to said semiconductor chip surface and at least the portions of said electrically conductive connections in proximity to said semiconductor chip with said hardening selected from the group consisting of: standing at room temperature, heating infrared irradiation, and electron beam irradiation,

irradiating said hardened silicone layer with ultraviolet radiation to form an ultraviolet irradiation processed hardened silicone layer,

covering said ultraviolet irradiation processed hardened silicone layer with a sealing resin which adheres to and covers the hardened silicone layer of said semiconductor chip surface and at least the portions of the electrical conducting connections in proximity to said semiconductor chip, and the surface of said ultraviolet irradiation processed hardened silicone layer adheres to and is unified with the sealing resin by which it is covered.

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**5,036,025**

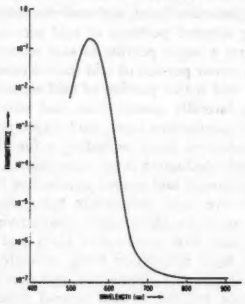
## INFRARED ABSORBING GREEN GLASS

**Yeong Lin, Sunnyvale, Calif., assignor to Hoya Optics Inc., Fremont, Calif.**

**Filed Oct. 2, 1990, Ser. No. 591,638**

**Int. Cl.[5] C03C *4/08, 4/10***

**U.S. Cl. 501—48** **7 Claims**



1. A phosphate-based green filter glass with strong absorption in the spectral range of 650 nm to 950 nm, consisting essentially of the following ingredients, in mol %:

(i) 50 to 60% $P_2O_5$

(ii) 0 to 5% $SiO_2$

(iii) 20 to 33% $Li_2O$, 0 to 25% $Na_2O$, 1 to 25% $K_2O$

(iv) 0 to 5% MgO, 0 to 5% CaO, 0 to 5% BaO, 0 to 5% SrO

(v) 7 to 10% $Al_2O_3$

(vi) 3 to 6% CuO

(vii) 0.5 to 1.6% $Cr_2O_3$

(viii) 0.5 to 2.0% $Ho_2O_3$

(ix) 0.5 to 2.0% $Dy_2O_3$

(x) 0 to 2.0% $Er_2O_3$.

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**5,036,026**

## SINTERED BODY OF ALUMINUM NITRIDE AND METHOD FOR PRODUCING THE SAME

**Akira Yamakawa; Hitoyuki Sakanoue, and Hisao Takeuchi, all of Itami, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan**

**Continuation of Ser. No. 236,942, Aug. 26, 1988, abandoned. This application Sep. 25, 1990, Ser. No. 588,475**

**Claims priority, application Japan, Aug. 28, 1987, 62-212939; Aug. 28, 1987, 62-212940; Aug. 28, 1987, 62-212941; Aug. 28, 1987, 62-212942; Aug. 28, 1987, 62-212943; Aug. 28, 1987, 62-212944; Aug. 28, 1987, 62-212945; Sep. 1, 1987, 62-216431**

**Int. Cl.[5] C04B *35/58***

**U.S. Cl. 501—96** **5 Claims**

1. A method for producing a sintered body of aluminum nitride which comprises steps of:

mixing alumina powder having a purity of not lower than 99.0% and an average particle size of not larger than 2 μm with 10 to 100 parts by weight of carbon or a compound which liberates carbon by heating in terms of carbon per 100 parts by weight of alumina,

molding the mixture and

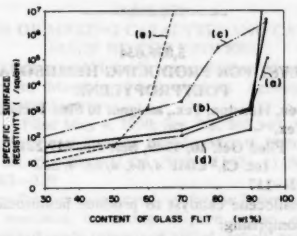
sintering the molded mixture at a temperature of 1,600 to 2,200 ° C. in an atmosphere containing nitrogen to produce the sintered body of aluminum nitride which has an average particle size of not larger than 5 μm.

5,036,027

## RESISTIVE PASTE AND RESISTOR MATERIAL THEREFOR

Shizuharu Watanabe, Kyoto; Hiroji Tani, and Keisuke Nagata, both of Nagaokakyo, all of Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Mar. 22, 1990, Ser. No. 497,402
Claims priority, application Japan, Mar. 22, 1989, 1-69764
Int. Cl.[5] C04B *35/58*; H01B *1/20*
U.S. Cl. 501—96 3 Claims




1. A resistor material having a composition expressed by the general formula: $Nb_xLa_{1-x}B_{6-4x}$ wherein x is a mol fraction of Nb and takes a value within the range: $0.1 \leqq x \leqq 0.9$.

5,036,028

## HIGH DENSITY METAL BORIDE-BASED CERAMIC SINTERED BODY

Tadahiko Watanabe; Tsuyoshi Doutsu; Kazuhisa Shobu, all of Tosu, and Yukio Kai, Fukuoka, all of Japan, assignors to Agency of Industrial Science and Technology, Tokyo, Japan

Continuation of Ser. No. 189,556, May 3, 1988, abandoned. This application Apr. 18, 1990, Ser. No. 511,816
Int. Cl.[5] C04B *35/58*
U.S. Cl. 501—96 8 Claims

1. A high density metal boride-based ceramic sintered body consisting essentially of 0.1 to 10 wt. % of a first component as a metal binder selected from the group consisting of cobalt boride, nickel boride, iron boride and mixtures thereof; 0.1 to 10 wt. % of at least one second component selected from the group consisting of a double carbide of Ti, Zr, Hf or W having an atomic ratio of metals of 1:9 to 9:1 and a double carbonitride of Ti, Zr, or Hf having an atomic ratio of metals of 1:19 to 9:1 and an atomic ratio of carbon to nitrogen of 1:9 to 9:1; and a remainder of at least one third component metal boride selected from the group consisting of $TiB_2$, $ZrB_2$, $CrB_2$, $HfB_2$, $VB_2$, $TaB_2$, $NbB_2$, $MnB_2$, $MoB_2$, $YB_2$, CrB, VB, TaB, NbB, MoB, HfB, YB, ZrB, TiB, MnB, $W_2B_5$ and $MO_2B_5$.

5,036,029

## SPRAYABLE INSULATING LINER COMPOSITIONS FOR METAL VESSELS

Howard B. Johnson, Cincinnati, Ohio, assignor to Consolidated Ceramic Products, Inc., Blanchester, Ohio

Filed Apr. 28, 1989, Ser. No. 344,897
Int. Cl.[5] C04B *35/44*
U.S. Cl. 501—121 8 Claims

1. An insulating liner composition admixed with water and sprayable onto a permanent refractory surface the water being in sufficient amount of said water so that no dust and virtually no rebound of said admixture occurs upon spraying on the inside of a metal carrying vessel to form an expendable liner having low thermal conductivity and high thermal expansion so that the vessel may be easily stripped of said liner after use thereon, comprising

a water insoluble and hydration resistant particulate refractory grain, or grain mixture, of at least about 50% by weight of MgO,

an organic binder and fibers, said binder in an amount effective to bind said particulate refractory grain and fibers in an essentially dried state on said refractory surface,

said composition being substantially free of water soluble alkali and alkaline earth metal oxides that would migrate during drying with said water to said permanent refractory liner thereby causing degradation or spalling of said permanent refractory.

5,036,030

## PROCESS FOR PREPARATION OF ALKALINE EARTH METAL ALUMINOSILICATE SINTERED BODY

Genji Taga, Tokuyama; Masaki Noritake, Shin-nanyo; Masahiro Nakamura, and Hua-Min Zhang, both of Tokuyama, all of Japan, assignors to Tokuyama Soda Kabushiki Kaisha, Japan

Filed Dec. 29, 1989, Ser. No. 459,422
Int. Cl.[5] C04B *35/02*
U.S. Cl. 501—125 12 Claims

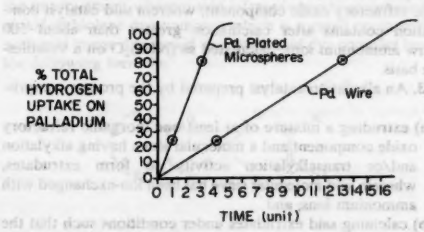
1. A process for the preparation of an alkaline earth metal aluminosilicate sintered body, which comprises molding a starting mixture comprising (i) a zeolite of an alkaline earth metal form having an $SiO_2/Al_2O_3$ molar ratio not higher than 3.0 or an amorphous calcination product formed by calcining said zeolite and (ii) a boron compound selected from the group consisting of boron oxide and boron compounds capable of being converted to boron oxide by firing, and firing the molded body at a temperature lower than 1000° C.

5,036,031

## METAL PLATED MICROSPHERE CATALYST

James A. Patterson, 2074 20th St., Sarasota, Fla. 34234

Division of Ser. No. 353,260, May 16, 1989, Pat. No. 4,943,355. This application Sep. 28, 1989, Ser. No. 413,980
Int. Cl.[5] B01J *35/08*
U.S. Cl. 502—10 9 Claims




1. A catalyst comprising:

a plurality of microspheres of equal size and density having a palladium plating of uniform thickness ranging from 1.962 to 1.760% of the microsphere volume formed atop a copper plate of uniform thickness;

said palladium plating having adsorbed hydrogen in a volume ratio in the range of 900 to 1050, hydrogen to palladium, respectively.

5,036,032

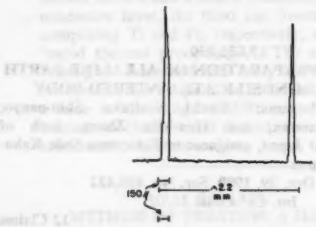
## SELECTIVE CATALYSTS AND THEIR PREPARATION FOR CATALYTIC HYDROCARBON SYNTHESIS

Enrique Iglesia, Clinton; Hilda Vroman, Piscataway; Stuart Soled, Pittstown; Joseph Baumgartner, Califon, and Rocco A. Fiato, Basking Ridge, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation-in-part of Ser. No. 323,077, Mar. 14, 1989, abandoned, which is a continuation of Ser. No. 173,263, Mar. 25, 1988, abandoned. This application Dec. 12, 1989, Ser. No. 450,957

Int. Cl.[5] B01J *21/12, 21/06, 23/70;* C07C *1/04*

U.S. Cl. 502—260 12 Claims



1. A method for preparing a supported cobalt catalyst particle which comprises:

(a) contacting a support particle with a molten cobalt salt, for a period sufficient to impregnate substantially all of the molten cobalt salt on the support to a depth of less than about 200 um;

(b) drying the supported cobalt salt obtained in step (a) and;

(c) reducing the cobalt of the supported cobalt salt in step (b) to metallic cobalt by heating the salt in the presence of $H_2$, wherein the heating is conducted at a rate of less than about 1° C./min. up to a maximum temperature ranging from about 200° C. to about 500° C., to produce a supported cobalt catalyst particle.

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5,036,033

## ALKYLATION CATALYST AND PROCESSES FOR PREPARING

Martin West, Huntington Beach, and Suheil F. Abdo, Placentia, both of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.

Filed May 26, 1989, Ser. No. 358,432

Int. Cl.[5] B01J *29/04, 29/08, 37/00*

U.S. Cl. 502—64 40 Claims

1. A catalyst composition comprising a molecular sieve having alkylation and/or transalkylation activity and an inorganic refractory oxide component, wherein said catalyst composition contains after calcination greater than about 500 ppmw ammonium ions, calculated as $(NH_4)_2O$ on a volatiles-free basis.

13. An alkylation catalyst prepared by the process comprising:

(a) extruding a mixture of at least one inorganic refractory oxide component and a molecular sieve having alkylation and/or transalkylation activity to form extrudates, wherein said molecular sieve has been ion-exchanged with ammonium ions; and

(b) calcining said extrudates under conditions such that the concentration of ammonium ions in said extrudates after said calcination is between about 500 and about 20,000 ppmw ammonium ions, calculated as $(NH_4)_2O$ on a volatiles-free basis.

14. An alkylation catalyst as defined by claim 13 wherein said molecular sieve is a steam-stabilized Y zeolite prepared by the process comprising:

(1) ammonium exchanging a sodium Y zeolite to a sodium content between about 0.6 and about 5 weight percent, calculated as $Na_2O$;

(2) calcining the ammonium-exchanged zeolite at a temperature between about 600° F. and about 1650° F. in the presence of steam at a water vapor partial pressure of at least about 0.2 p.s.i.a. to reduce the unit cell size of said ammonium-exchanged zeolite to a value in the range between about 24.40 and about 24.64 Angstroms; and

(3) ammonium exchanging the steam-calcined zeolite to reduce the sodium content of the zeolite below about 0.6 weight percent, calculated as $Na_2O$.

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5,036,034

## CATALYST FOR PRODUCING HEMIISOTACTIC POLYPROPYLENE

John A. Ewen, Houston, Tex., assignor to Fina Technology, Inc., Dallas, Tex.

Filed Oct. 10, 1989, Ser. No. 419,221

Int. Cl.[5] C08F *4/64, 4/68, 4/622*

U.S. Cl. 502—117 8 Claims

5. A metallocene catalyst to produce hemiisotactic olefin polymers comprising:

a) a metallocene compound; and

b) an ionizing agent; wherein the metallocene compound comprises the general formula:

$$R''(CpR_n(CpR'_m)MHal_2$$

where Cp is cyclopentadienyl or a substituted cyclopentadienyl, each R and R' is a hydrocarbyl radical having from 1-20 carbon atoms and is the same or different and is selected such that $CpR'_m$ is a sterically different ring from $CpR_n$ resulting in a lack of bi-lateral symmetry for the compound, R'' is a structural bridge imparting stereorigidity to the compound, M is a Group 3, Group 4, Group 5 or Group 6 metal, n is from 0 to 4, m is from 0 to 4 and Hal is a halogen and wherein the ionizing agent converts a neutral metallocene compound to a metallocene cation which operates as a catalyst to produce hemiisotactic polymers.

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5,036,035

## SOLID STRONG ACID CATALYST PROCESS FOR THE PRODUCTION OF THE SAME AND USE THEREOF

Shigeo Baba; Yukio Shibata; Takahiro Kawamura; Hideo Takaoka, all of Yokkaichi; Tsuguo Kimura, Yokosuka; Kazuo Kousaka, Shinagawa; Yoshihiro Minato, Chigasaki; Naruo Yokoyama, Hiroshima; Kozo Iida, Hiroshima, and Tetsuya Imai, Hiroshima, all of Japan, assignors to Research Association for Utilization of Light Oil, Tokyo, Japan

Continuation-in-part of Ser. No. 15,564, Feb. 13, 1987, abandoned, which is a continuation of Ser. No. 774,231, Sep. 9, 1985, abandoned. This application Mar. 21, 1989, Ser. No. 326,418

Claims priority, application Japan, Sep. 10, 1984, 59-188206; Sep. 10, 1984, 59-188207; Dec. 26, 1984, 59-273481; Dec. 26, 1984, 59-273482; Mar. 25, 1985, 60-58229

Int. Cl.[5] B01J *27/02, 31/12*

U.S. Cl. 502—221 10 Claims

1. A solid strong acid catalyst consisting essentially of a sulfate ($SO_4^{2-}$) and at least one metal selected from the group consisting of platinum, ruthenium, rhodium and palladium supported on a support consisting of at least one member selected from the group consisting of hydroxides and oxides of zirconium, wherein the sulfate is supported in a proportion of 0.1 to 7.2 parts by weight to 100 parts by weight of the support, and wherein said metal is supported in a proportion of 0.01 to 10 parts by weight to 100 parts by weight of the support, the thus supported catalyst being calcined at a temperature of 575° to 800° C.

5,036,036

## CHROMIUM OXIDE CATALYST COMPOSITION

Jan J. Lerou, Chadds Ford, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 13, 1989, Ser. No. 365,594
Int. Cl.[5] B01J 23/02, 23/26
U.S. Cl. 502—317 5 Claims

1. A catalyst composition comprising $Cr_2O_3$ prepared by pyrolysis of $(NH_4)_2Cr_2O_7$ and containing an alkali metal content of 100 ppm or less.

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5,036,037

## PROCESS OF MAKING CATALYSTS AND CATALYSTS MADE BY THE PROCESS

Wolfgang Kladnig, and Heinz Krivanec, both of Vienna, Austria, assignors to Maschinenfabrik Andritz Actiengesellschaft, Graz-Andritz, Austria

Filed May 4, 1990, Ser. No. 518,947
Claims priority, application Austria, May 9, 1989, 1101/89
Int. Cl.[5] B01J 21/06, 23/22, 23/24, 23/74
U.S. Cl. 502—319 7 Claims

1. Process for producing catalysts for use in heterogeneously catalyzed reactions, consisting of pure oxides, mixtures of oxides or mixed oxide crystals of nickel, cobalt, molybdenum, vanadium, chromium, aluminum, iron, titanium, and tungsten, starting with the aqueous solutions of the respective salts, comprising the steps of:

spraying said solution into a hydropyrolysis reactor, whereby a thermal dissociation of the primary molecules occurs to form their respective oxides in powdered form, with specific surface areas of 1 to 100 $m^2/g$ and agglomerate structures of 1 to 500 microns, having a mean particle size of 20 to 30 microns, converting the corresponding acids by hydrolyzing the anions of the primary solutions; and recovering in full said corresponding acids.

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5,036,038

## COMPOSITION INVOLVING NIO-$V_2O_3$-$TiO_2$

Arnulf Muan, Lacey Spring, Va., and Mitri S. Najjar, Wappingers Falls, N.Y., assignors to Texaco Inc., White Plains, N.Y.

Filed Apr. 12, 1990, Ser. No. 507,803
Int. Cl.[5] B01J 21/00, 23/74
U.S. Cl. 502—335 14 Claims

1. A method of preparing compositions from NiO, $V_2O_3$ and $TiO_2$ wherein said compositions fall within the shaded area circumscribed by ABCDE as shown in the disclosed FIGURE, and wherein said method comprises the steps of:

(1)heating $V_2O_5$ powder having a particle size of less than about 50 microns in an atmosphere in which the partial pressure of oxygen is in the range of $10^{-8}$ to 10—10 atmospheres while starting at a temperature of 600° C. and gradually increasing the temperature over a period in the range of about 12 to 24 hours to about 1300° C. and holding the temperature at about 1300° C. for a period to ensure complete reduction of all vanadium to $V^{3+}$;

(2) separately heating $TiO_2$ and NiO powders each having a particle size of less than about 50 microns for a period of about 600° C. to 800° C. for $TiO_2$ and about 700° C. to 1000° C. for NiO;

(3) thoroughly grinding together about 14 to 98 wt. % of $V_2O_3$ from (1), with about 0 to 66 wt. % of $TiO_2$ and about 2 to 60 wt. % of NiO from (2) to produce a mixture having a grain size of less than about 50 microns;

(4) pelletizing the mixture from (3) at a pressure of about 5,000 psi; and

(5) heating and reacting together the pellets from (4) at a temperature in the range of about 900° C. to 1600 ° C. for a period in the range of about ½ to 48 hrs. in an atmosphere in which the partial pressure of oxygen is in the range of $10^{-8}$ to $10^{-3}$ atmosphere.

11. Compositions produced from NiO, $V_2O_3$ and $TiO_2$, wherein said compositions are solid solutions and fall within the shaded area circumscribed by ABCDE as shown in the disclosed FIGURE wherein the amounts of NiO, $V_2O_3$ and $TiO_2$ are characterized as shown in the table below:

| | Coordinates (Wt %) | | |
|---|---|---|---|
| Vertices | NiO | $V_2O_3$ | $TiO_2$ |
| A | 60 | 40 | 0 |
| B | 60 | 14 | 26 |
| C | 20 | 14 | 66 |
| D | 2 | 32 | 66 |
| E | 2 | 98 | 0. |

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5,036,039

## HEAT-SENSITIVE RECORDING MATERIAL

Mikiya Sekine, Warabi, and Shigetoshi Hiraishi, Tokyo, both of Japan, assignors to Mitsubishi Paper Mills Limited, Tokyo, Japan

Filed Aug. 10, 1990, Ser. No. 565,238
Claims priority, application Japan, Nov. 14, 1989, 1-296349
Int. Cl.[5] B41M 5/30
U.S. Cl. 503—217 7 Claims

1. A heat-sensitive recording material comprising an aromatic isocyanate compound, an imino compound which reacts with said aromatic isocyanate compound upon application of heat to form color, and a support, said support having been coated with a dispersion obtained by mixing a) a dispersion of said aromatic isocyanate and an alcoholic compound prepared by simultaneously pulverizing said aromatic isocyanate and said alcoholic compound and b) a dispersion of said imino compound.

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5,036,040

## INFRARED ABSORBING NICKEL-DITHIOLENE DYE COMPLEXES FOR DYE-DONOR ELEMENT USED IN LASER-INDUCED THERMAL DYE TRANSFER

Derek D. Chapman, and Charles D. DeBoer, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

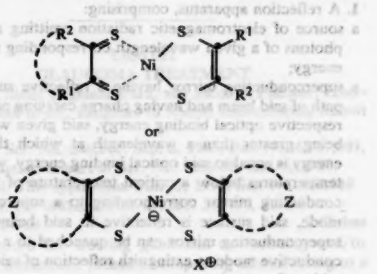
Continuation-in-part of Ser. No. 369,492, Jun. 20, 1989, abandoned. This application Apr. 20, 1990, Ser. No. 513,323
Int. Cl.[5] B41M 5/035, 5/26
U.S. Cl. 503—227 15 Claims

6. In a process of forming a laser-induced thermal dye transfer image comprising

a) imagewise-heating by means of a laser a dye-donor element comprising a support having thereon a dye layer comprising a polymeric binder, an image dye and an infrared-absorbing material which is different from said image dye in said dye layer, and

b) transferring a dye image to a dye-receiving element to form said laser-induced thermal dye transfer image,

the improvement wherein said infrared-absorbing material is a nickel-dithiolene dye complex which is located coextensively with said image dye in said dye layer, said dye complex having the following formula:




wherein: each $R^1$ and $R^2$ independently represents a substituted

or unsubstituted alkyl group having from 1 to about 10 carbon atoms or one of $R^1$ and $R^2$, but not both simultaneously, represents a substituted or unsubstituted aryl or hetaryl group having from about 5 to about 10 atoms;

or $R^1$ and $R^2$ may be combined together with the carbon atoms to which they are attached to form a 5- to 7-membered substituted or unsubstituted carbocyclic ring;

each Z independently represents the atoms necessary to complete a 6-membered substituted or unsubstituted benzene ring; and

$X^{\oplus}$ is a monovalent cation.

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5,036,041

## HEAT TRANSFER SHEET

Jumpei J. K. Kanto; Hitoshi H. S. Saito; Hiroshi H. E. Eguchi, and Masayuki M. N. Nakamura, all of Tokyo, Japan, assignors to Dai Nippon Insatsu Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 15, 1990, Ser. No. 480,719

Claims priority, application Japan, Feb. 15, 1989, 1-33753; Aug. 4, 1989, 1-202459

Int. Cl.[5] B41M *5/35, 5/26*

U.S. Cl. 503—227 7 Claims

1. A heat transfer sheet comprising:

a substrate sheet; and

at least a dye layer of cyan color formed on at least one surface of said substrate sheet, said dye layer comprising a binder and a mixture of at least two kinds of sublimable cyan dyes, one dye having a maximum absorption on the longer wavelength side of 660 nm or longer, and another dye having a maximum absorption at 650 nm or shorter when color formation is effected on an image-receiving sheet.

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5,036,042

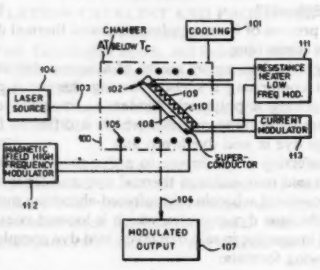
## SWITCHABLE SUPERCONDUCTING MIRRORS

Aharon Z. Hed, Nashua, N.H., assignor to International Superconductor Corp., Riverdale, N.Y.

Filed Dec. 29, 1988, Ser. No. 291,685

Int. Cl.[5] H01B *12/00*; G02B *5/08*

U.S. Cl. 505—1 29 Claims




1. A reflection apparatus, comprising:

a source of electromagnetic radiation emitting a beam of photons of a given wavelength corresponding to a given energy;

a superconducting mirror having a reflective surface in a path of said beam and having charge carrying pairs with a respective optical binding energy, said given wavelength being greater than a wavelength at which the photon energy is equal to said optical binding energy, whereby at temperatures below a critical temperature of the superconducting mirror corresponding to a superconductive mode, said surface is reflective to said beam, and the superconducting mirror can be quenched to a nonsuperconductive mode to extinguish reflection of said beam by said surface; and

means operatively coupled to said superconducting mirror for selectively quenching said superconducting mirror to said nonsuperconductive mode.

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5,036,043

## PROCESS FOR MAKING 90 K SUPERCONDUCTORS

Munirpallam A. Subramanian, New Castle, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 76,686, Jul. 22, 1987, abandoned, which is a continuation-in-part of Ser. No. 51,860, May 19, 1987, abandoned. This application May 24, 1990, Ser. No. 529,752

Int. Cl.[5] H01L *39/12*

U.S. Cl. 505—1 18 Claims

1. An improved process for preparing a superconducting composition having the formula $MBa_2Cu_3O_x$ wherein

M is selected from the group consisting of Y, Nd, Sm, Eu, Gd, Dy, Ho, Er, Tm, Yb and Lu;

x is from about 6.5 to about 7.0;

said composition having a superconducting transition temperature of about 90 K;

said process consisting essentially of mixing $M_2O_3$, $BaO_2$ and CuO in an atomic ratio of M:Ba:Cu of about 1:2:3 to obtain a powder mixture; heating the resulting mixture in an oxygen-containing atmosphere at a temperature from about 850° C. to about 925° C. for a time sufficient to form $MBa_2Cu_3O_y$, where y is from about 6.0 to about 6.4; and maintaining the $MBa_2Cu_3O_y$ in an oxygen-containing atmosphere while cooling for a time sufficient to obtain the desired product, said process not requiring additional heating steps.

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5,036,044

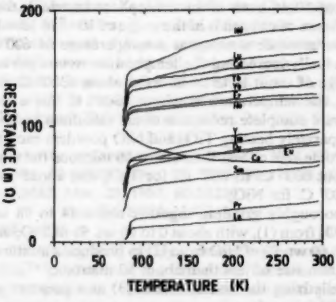
## R-TL-SR-CA-CU-O SUPERCONDUCTORS

Allen M. Hermann, and Zhengzhi Sheng, both of Fayetteville, Ark., assignors to University of Arkansas, Little Rock, Ark.

Filed Sep. 29, 1988, Ser. No. 251,348

Int. Cl.[5] C01F *11/02, 17/00*; C01G *3/02, 15/00*

U.S. Cl. 505—1 6 Claims




1. A composition having superconductive properties the composition comprising a melt produced complex having the nominal formula:

R-Tl-Sr-Ca-Cu-O

wherein R is a rare earth metal, and the atomic molar ratio of R:Tl:Sr:Ca:CU is 1:2:2:2:3.

5,036,045

## METHOD FOR INCREASING GROWTH HORMONE SECRETION

Michael O. Thorner, Charlottesville, Va., assignor to The University of Virginia Alumni Patents Foundation, Charlottesville, Va.

Continuation of Ser. No. 775,249, Sep. 12, 1985, abandoned. This application Sep. 16, 1988, Ser. No. 245,269

Int. Cl.[5] A61K *37/36*

U.S. Cl. 514—12 1 Claim

1. A method for increasing growth hormone secretion in a human patient, which comprising continuously, intravenously administering a human growth hormone releasing factor to said patient for a period of ten days, at a dosage level of 1.0 mg/kg/min. to 100 mg/kg/min.

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5,036,046

## METHOD FOR ENHANCING HEALING OF CORNEAL ENDOTHELIAL WOUNDS

Arthur H. Neufeld, Newton Highlands; Nancy C. Joyce, Sudbury, both of Mass., and Marcia M. Jumblatt, Louisville, Ky., assignors to Eye Research Institute of Retina Foundation, Inc., Boston, Mass.

Filed Oct. 12, 1988, Ser. No. 256,847

Int. Cl.[5] A61K *37/00, 31/40*

U.S. Cl. 514—12 23 Claims

1. A method for enhancing healing and restoring function of corneal endothelial tissue comprising manipulating migration, elongation, and spreading of corneal endothelial cells by administering to corneal endothelial cells a composition wherein the active agent consists of a combination of non-steroidal antiinflammatory compounds that inhibit the arachidonic acid pathway and EGF-like growth factors altering cell function by binding to a specific cell surface receptor, wherein said composition is administered in a pharmaceutically acceptable carrier for intraocular administration in an amount and form restoring corneal endothelial tissue function.

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5,036,047

## METHOD AND COMPOSITION FOR PREVENTING CONCEPTION

Abdus S. Mia, Terre Haute, Ind., assignor to Pitman-Moore, Inc., Lake Forest, Ill.

Filed Sep. 29, 1988, Ser. No. 250,557

Int. Cl.[5] A61K *37/38*

U.S. Cl. 514—15 18 Claims

1. A method for preventing conception in mammals, consisting essentially of:

administering to said mammals a composition consisting essentially of (1) free LHRH which acts to prevent conception in the mammal during the period from administration to about 6 weeks and (2) an immunogenic conjugate between a protein and LHRH selected from the group consisting of a formula:

Lys-Trp-Ser-Tyr-Gly-Leu-Arg-Pro-Gly-$NH_2$

and

Cys-Lys-Trp-Ser-Tyr-Gly-Leu-Arg-Pro-Gly-$NH_2$

or mixtures thereof, which acts to prevent conception during the period from about 6 weeeks after administration until the LHRH antibodies formed in response to the conjugate are metabolized, about 0.5–2 years.

5,036,048

## ANGIOTENSIN II RECEPTOR BLOCKERS AS ANTIGLAUCOMA AGENTS

Robert W. Watkins, Great Meadows, N.J., assignor to Schering Corporation, Kenilworth, N.J.

Filed Mar. 7, 1986, Ser. No. 837,452

Int. Cl.[5] A61K *31/475, 31/13, 31/54*

U.S. Cl. 514—16 14 Claims

1. A method for reducing and controlling elevated intraocular pressure in a mammal which comprises topically administering to an eye of said mammal an angiotensin II receptor blocker in combination with an ophthamologically acceptable carrier for topical use and a composition comprising an amount of a beta-adrenergic blocking agent in combination with an opthamologically acceptable carrier for topical use, wherein said angiotensin II receptor blocker and said beta-adrenergic blocking agent are topically administered separately and wherein the combined amounts of each, when topically administered separately, constitute an intraocular pressure reducing effective amount.

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5,036,049

## LYOPHILIZED PEPTIDE FORMULATIONS

Tapan Audhya, Bridgewater, and Gideon Goldstein, Short Hills, both of N.J., assignors to Immunobiology Research Institute, Inc., Annandale, N.J.

Continuation-in-part of Ser. No. 336,236, Apr. 11, 1989. This application Jul. 17, 1990, Ser. No. 554,198

Int. Cl.[5] A61K *37/02*

U.S. Cl. 514—17 16 Claims

1. A method for producing lyophilized thymopentin which retains a bioactivity similar to that of freshly prepared thymopentin comprising subjecting said peptide to freezing and lyophilizing conditions in admixture with a physiologically acceptable high solubility buffering salt and a stabilizing composition comprising the combination of effective amounts of raffinose at a concentration of between 1 to 6% by weight and glycine at a concentration of between 0.5 and 5% by weight.

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5,036,050

## COMPOSITIONS CONTAINING THYMOPENTIN FOR TOPICAL TREATMENT OF SKIN DISORDERS

Tapan Audhya, Bridgewater; Krishnamurthy Venkatasubramanian, South Somerville, and Gideon Goldstein, Short Hills, all of N.J., assignors to Immunobiology Research Institute, Inc., Annandale, N.J.

Continuation-in-part of Ser. No. 296,134, Jan. 12, 1989 abandoned. This application Dec. 19, 1989, Ser. No. 452,757

Int. Cl.[5] A61K *37/00, 9/06*

U.S. Cl. 514—17 26 Claims

1. A therapeutic composition for use in the treatment of a skin disorder comprising an effective amount of thymopentin or an analog thereof in a pharmaceutically acceptable carrier suitable for topical administration directly onto the surface of the skin.

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5,036,051

## GLAUCOMA TREATMENT

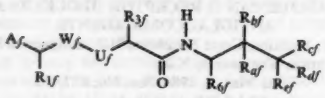
Herman H. Stein, Highland Park, and Jacob J. Plattner, Libertyville, both of Ill., assignors to Abbott Laboratories, Abbott Park, Ill.

Division of Ser. No. 240,567, Sep. 8, 1988, Pat. No. 4,927,807, Continuation-in-part of Ser. No. 105,636, Oct. 6, 1987, abandoned. This application Mar. 2, 1990, Ser. No. 488,810

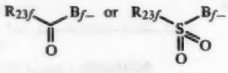
Int. Cl.[5] A61K *37/00, 31/535, 31/415, 31/24*

U.S. Cl. 514—18 7 Claims

1. A method for treating glaucoma or reducing and/or controlling intraocular pressure comprising administering to a patient in need a therapeutically effective amount of a renin inhibiting compound of the formula:



wherein $A_f$ is hydrogen, loweralkyl, arylalkyl, $-OR_{10f}$ or $-SR_{10f}$ wherein $R_{10f}$ is hydrogen, loweralkyl or aminoalkyl, $-NR_{11f}R_{12f}$ wherein $R_{11f}$ and $R_{12f}$ are independently selected from hydrogen, loweralkyl, aminoalkyl, cyanoalkyl, hydroxyalkyl, carboxyalkyl, alkoxycarbonylalkyl, (amino)carboxyalkyl, ((N-protected)amino)carboxyalkyl, (alkylamino)carboxyalkyl, ((N-protected)alkylamino)carboxyalkyl, (dialkylamino)carboxyalkyl, (amino)alkoxycarbonylalkyl, ((N-protected)amino)alkoxycarbonylalkyl, (alkyamino)alkoxycarbonylalkyl, ((N-protected)alkylamino)alkoxycarbonylalkyl and (dialkylamino)alkoxycarbonylalkyl; or $A_f$ is



wherein $B_f$ is NH, alkylamino, S, O, $CH_2$ or CHOH and $R_{23f}$ is loweralkyl, cycloalkyl, aryl, arylalkyl, alkoxy, alkenyloxy, hydroxyalkoxy, dihydroxyalkoxy, arylalkoxy, arylalkoxyalkyl, amino, alkylamino, dialkylamino, (hydroxyalkyl)(alkyl)amino, (dihydroxyalkyl)(alkyl)amino, aminoalkyl, N-protected-aminoalkyl, alkylaminoalkyl, (N-protected)(alkyl)aminoalkyl, dialkylaminoalkyl, carboxyalkoxyalkyl, (alkoxycarbonyl)alkoxyalkyl, carboxyalkyl, carboxyalkylamino, alkoxycarbonylalkyl, alkoxycarbonylalkylamino, (amino)carboxyalkyl, (amino)carboxyalkylamino, ((N-protected)amino)carboxyalkyl, ((N-protected)amino)-carboxyalkyamino, (alkylamino)-carboxyalkyl, (alkylamino)carboxyalkylamino, ((N-protected)alkylamino)-carboxyalkyl, ((N-protected)alkylamino)carboxyalkylamino, (dialkylamino)carboxyalkyl, (dialkylamino)carboxyalkylamino, (amino)alkoxycarbonylalkyl, (amino)alkoxycarbonylalkylamino, ((N-protected)amino)alkoxycarbonylalkyl, ((N-protected)amino)- alkoxycarbonylalkylamino, (alkylamino)alkoxycarbonylalkyl, (alkylamino)alkoxycarbonylalkylamino, ((N-protected)alkylamino)alkoxycarbonylalkyl, ((N-protected)alkylamino)alkoxycarbonylalkylamino, (dialkylamino)alkoxycarbonylalkyl, (dialkylamino)alkoxycarbonylalkylamino, aminocycloalkyl, aminoalkylamino, dialkylaminoalkyl(alkyl)amino, arylalkylamino, arylalkyl(alkyl)amino, alkoxyalkyl(alkyl)amino, (polyalkyoxy)-alkyl(alkyl)amino, di-(alkoxyalkyl)amino, di-(hydroxyalkyl)amino, di-((polyalkoxy)alkyl)amino, polyalkoxy, (polyalkoxy)alkyl, (heterocyclic)alkyl or a substituted or unsubstituted heterocyclic wherein saturated heterocyclics may be unsubstituted, monosubstituted or disubstituted with hydroxy, oxo, amino, alkylamino, dialkylamino, alkoxy, polyalkoxy or loweralkyl; unsaturated heterocyclics may be unsubstituted or monosubstituted with hydroxy, amino, alkylamino, dialkylamino, alkoxy, polyalkoxy or loweralkyl;

$W_f$ is C=O or CHOH;

$U_f$ is $CH_2$ or $NR_{2f}$ provided that when $W_f$ is CHOH then $U_f$ is $CH_2$;

$R_{1f}$ is loweralkyl, cycloalkylmethyl, benzyl, 4-methoxybenzyl, halobenzyl, (1-naphthyl)methyl, (2-naphthyl)methyl, (4-imidazolyl)methyl, (alpha,alpha)-dimethylbenzyl, 1-benzyloxyethyl, phenethyl, phenoxy, thiophenoxy or anilino; provided that when $R_{1f}$ is phenoxy, thiophenoxy or anilino, then $B_f$ is $CH_2$ or CHOH or $A_f$ is hydrogen;

$R_{2f}$ is hydrogen or loweralkyl;

$R_{3f}$ is loweralkyl, loweralkenyl, ((alkoxy)alkoxy)loweralkyl, (thioalkoxy)alkyl, benzyl or heterocyclic ring substituted methyl;

$R_{6f}$ is loweralkyl, cycloalkylmethyl or benzyl;

$R_{af}$ is vinyl, formyl, hydroxymethyl or hydrogen;

$R_{df}$ is hydrogen or loweralkyl;

$R_{bf}$ and $R_{ef}$ are independently selected from OH and $NH_2$; and

$R_{cf}$ is hydrogen, loweralkyl, vinyl or arylalkyl; or a pharmaceutically acceptable salt or ester thereof, in combination with a therapeutically effective amount of a beta-adrenergic antagonist compound.

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**5,036,052**

## AMINO ACID NUTRIENT COMPOSITIONS

**Kohji Ozeki; Yoshitsugu Tsukamoto; Hideya Yaginuma, all of Shiga, and Makoto Sato, Moriyama, all of Japan, assignors to Morishita Pharmaceutical Co., Ltd., Osaka and Ajinomoto Co., Inc., Tokyo, both of, Japan**

**Filed Jun. 21, 1989, Ser. No. 369,123**

**Claims priority, application Japan, Jun. 22, 1988, 63-155744; Aug. 26, 1988, 63-212758; Oct. 25, 1988, 63-270558; Oct. 28, 1988, 63-273826; Dec. 7, 1988, 63-310772**

**Int. Cl.[5] A61K *31/00, 31/415, 31/40, 31/195***

**U.S. Cl. 514—19** **2 Claims**

1. In an aqueous nutrient infusion solution comprising an effective amount of essential L-amino acids, including L-tryptophan, the improvement therein being that (a) substantially all of said L-tryptophan is in the form of L-tryptophyl-L-alanine or L-tryptophyl-L-leucine or mixtures thereof and (b) wherein said solution does not have a stabilizer as an ingredient thereof.

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**5,036,053**

## DIOL-CONTAINING RENIN INHIBITORS

**Richard Himmelsbach, San Jose, Calif.; John C. Hodges; James S. Kaltenbronn, both of Ann Arbor, Mich.; William C. Patt, Chelsea, Mich.; Joseph T. Repine, Ann Arbor, Mich., and Ila Sircar, Ann Arbor, Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.**

**Continuation-in-part of Ser. No. 199,990, May 27, 1988, abandoned. This application Mar. 15, 1989, Ser. No. 321,638**

**Int. Cl.[5] A61K *37/02***

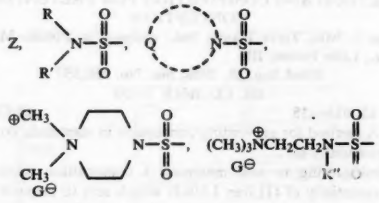
**U.S. Cl. 514—19** **12 Claims**

1. A peptide of the formula

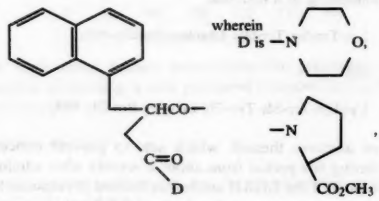
A—X—Y—W I

or a pharmaceutically acceptable acid addition salt thereof, wherein

A is BOC, IVA, NVA, BNMA, BMA, BBSP,



wherein G is hydroxyl or halide.



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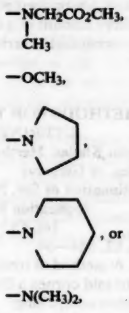
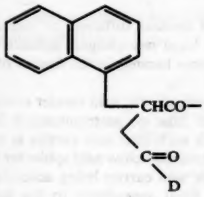


wherein R and R' are each independently hydrogen, straight or branched chain lower alkyl, or R and R' are each independently hydrogen or P—$CH_2CH_2$—, wherein P can be OR'', SR'', NR''R''' or NR''COR'' wherein R'' and R''' can be hydrogen, or straight or branched chain lower alkyl, or P is NR''R''' where it forms a heterocyclic ring containing from 4 to 6 carbon atoms or containing one or more atoms selected from S, O, or NR''.

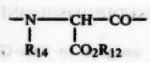
is a saturated ring containing 1 to 5 carbon atoms wherein Q is $CH_2$, O, S, or NR;

X is absent, PHE, HOMOPHE, NAPHTHYLALA, CYCLOHEXYLALA, TYR, or TYR(OMe) with the proviso that when A is BNMA, BBSP, or

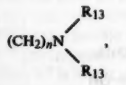


X is absent.

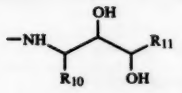
Y is



$R_{12}$ is hydrogen, lower alkyl, aralkyl, alkenyl, alkynyl, or



where $R_{13}$ is H or lower alkyl; $R_{14}$ is H or $CH_3$; and W is



where $R_{10}$ is lower alkyl, cycloalkyl, cycloalkylmethyl or benzyl and $R_{11}$ is lower alkyl.

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**5,036,054**

## RENIN INHIBITORS CONTAINING ALPHA-HETEROATOM AMINO ACIDS

**James S. Kaltenbronn, and Joseph T. Repine, both of Ann Arbor, Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.**

**Continuation-in-part of Ser. No. 154,727, Feb. 11, 1988. This application Jun. 6, 1988, Ser. No. 200,444**

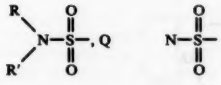
**Int. Cl.[5] A61K** *37/02*; **C07K** *5/06, 5/08*

**U.S. Cl. 514—19** **11 Claims**

1. A peptide of the formula

ACYL—X—Y—W—U—V (I)

or a pharmaceutically acceptable acid addition salt thereof, wherein acyl is BOC, IVA, DNMA, BBSP,



wherein

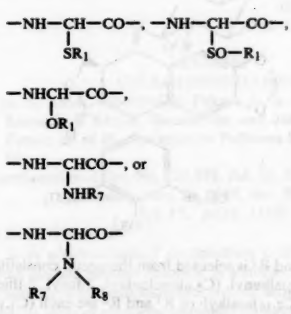
R and R' are each independently hydrogen or straight or branched chain lower alkyl,

is a saturated ring containing 1 to 5 carbon atoms wherein Q is $CH_2$, O, or NR;

X is absent, PHE, NAPHTHYLALA, or O-MeTYR, with the proviso that when ACYL is DNMA,

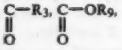
X is absent;

Y is



wherein $R_1$ is lower alkyl, lower alkenyl, lower alkynyl, aryl, $(CH_2)_n$—$NHR_2$, wherein n is an integer of from 2 to 4, and $R_2$ is

wherein $R_7$ is $R_1$,



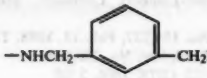
H,

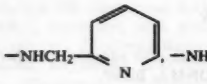
wherein $R_8$ is lower alkyl and $R_9$ is alkyl or aralkyl;

W is STA, CYSTA, DFKSTA, DFKCYS,

U is absent, and

V is $-NHCH_2Ph$,





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**5,036,055**

**ACYLATED DERIVATIVES OF ETOPOSIDE**

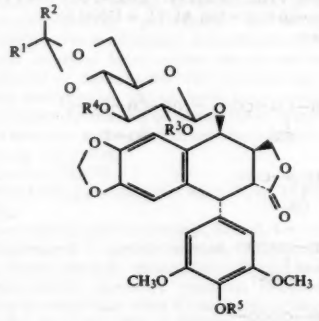
**Takeshi Ohnuma, Tokyo; Rika Obata, Kamakura; Hideo Kamei, Tokyo, and Takayuki Naito, Kawasaki, all of Japan, assignors to Bristol-Myers Company, New York, N.Y.**

**Filed Jun. 7, 1989, Ser. No. 362,555**

**Int. Cl.[5] A61K *31/70*; C07H *15/00***

**U.S. Cl. 514—27** **12 Claims**

1. A compound having the formula



wherein $R^2$ is H and $R^1$ is selected from the group consisting of $C_{1-10}$alkyl, $(C_{2-10})$alkenyl, $(C_{5-6})$cycloalkyl, 2-furyl, 2-thienyl, $(C_{6-10})$aryl, and $(C_{7-14})$aralkyl; or $R^1$ and $R^2$ are each $(C_{1-10})$alkyl; or $R^1$, $R^2$ and the carbon to which they are attached together represent $C_{5-6}$cycloalkyl; one of $R^3$ and $R^4$ is H and the other is selected from the group consisting of $(C_{1-5})$alkanoyl and benzoyl; or $R^3$ and $R^4$ are the same and are selected from the group consisting of $(C_{1-5})$ alkanoyl and benzoyl: $R^5$ is H or a phosphate group.

12. A pharmaceutical composition comprising an antitumor effective amount of a compound of claim 1 and a pharmaceutically acceptable carrier.

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**5,036,056**

**METHODS FOR TREATING DAMAGED CORNEAL, UTERINE, OR CARTILAGE TISSUE**

**Martin Kludas, Herthastrasse 22, D-1000 West Berlin-33, Fed. Rep. of Germany**

**Continuation of Ser. No. 70,991, Jul. 8, 1987, abandoned. This application Mar. 27, 1990, Ser. No. 500,330**

**Int. Cl.[5] A61K *31/715*; C07H *5/04***

**U.S. Cl. 514—54** **31 Claims**

1. A method of treating a damaged cornea comprising applying to said cornea a therapeutically effective amount of a composition comprising:

(a) a sterile extracellular connective tissue matrix composition comprising collagens, proteoglycans, glycosaminoglycans and glycoproteins, wherein said collagens, said proteoglycans, said glycosaminoglycans, and said glycoproteins have each been extracted from an extracellular connective tissue matrix and are in their native structural form, and

(b) a pharmaceutically acceptable carrier.

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**5,036,057**

**METHOD OF TREATING GASTROESOPHAGEAL REFLUX**

**Christopher J. Martin, Victoria, Australia, assignor to The University of Melbourne, Parkville, Australia**

**Continuation of Ser. No. 127,662, Dec. 21, 1987, abandoned. This application Jun. 21, 1989, Ser. No. 370,111**

**Claims priority, application Australia, Jan. 3, 1986, PH4084**

**Int. Cl.[5] A61K *31/715, 31/44, 31/47, 31/24, 31/16, 31/135***

**U.S. Cl. 514—54** **10 Claims**

1. A method of delivering a local anaesthetic proximate to the fundic mucosa in the fundus of the stomach for the treatment of gastroesophageal reflux, said method comprising administering to a host in need thereof a pharmaceutical composition comprising:

(i) a local anaesthetic in an amount sufficient to indirectly inhibit relaxation of the local oesophageal sphincter by acting on mechanoreceptors located in the fundus of the stomach, and

(ii) a carrier for said local anaesthetic, said carrier comprising a material adapted to float on gastrointestinal fluids contained in the stomach such that said carrier is more proximate to the gastric mucosa below said sphincter than said gastrointestinal fluids, said carrier being accordingly adapted to deliver said local anaesthetic to the fundic mucosa such that it is able to act on said mechanoreceptors.

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**5,036,058**

**N-SUBSTITUTED AMINOALKANEDIPHOSPHONIC ACIDS**

**Knut A. Jaeggi, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

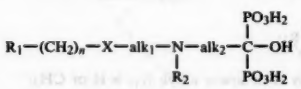
**Filed Feb. 16, 1990, Ser. No. 481,482**

**Claims priority, application Switzerland, Mar. 8, 1989, 866/89**

**Int. Cl.[5] A61K *31/675*; C07F *9/02***

**U.S. Cl. 514—86** **29 Claims**

1. A compound of the formula I



wherein $R_1$ is a phenyl, naphthyl, imidazolyl, thiazolyl, oxazolyl, pyridyl, pyrimidinyl or pyridazinyl radical which is unsubstituted or monosubstituted, disubstituted or trisubstituted by lower alkyl, lower alkoxy, lower alkylenedioxy, hydroxyl, halogen and/or trifluoromethyl, n is 0, 1, 2 or 3, X is oxy, thio, sulfinyl, sulfonyl, imino or lower alkylimino, $alk_1$ is lower alkylene, $R_2$ is hydrogen, lower alkyl or lower alkenyl and $alk_2$ is lower alkylene or a pharmaceutically acceptable salt thereof.

29. Method of treatment of inflammatory processes of the joints, degenerative processes in articular cartilage, osteoporosis, periodontitis, hyperparathyroidism and calcium deposits in blood vessels and prosthetic implants comprising administering a compound according to claim 1 or a pharmaceutically acceptable salt thereof to a warm-blooded animal in need of such treatment.

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**5,036,059**

## 1,4-DIHYDROPYRIDINE-3-CARBOXYLATE DERIVATIVES

**Kiyoshi Kimura, Osaka, and Iwao Morita, Kyoto, both of Japan, assignors to Nippon Shinyaku Company, Limited, Japan**

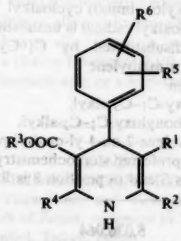
**Filed Apr. 17, 1985, Ser. No. 724,019**

**Claims priority, application Japan, Apr. 19, 1984, 59-79560**

**Int. Cl.[5] A61K** *31/675;* **C07D** *211/92*

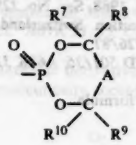
**U.S. Cl. 514—89** **60 Claims**

1. A compound of the formula (I):



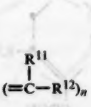
(I)

or a pharmaceutically acceptable salt thereof wherein $R^1$ is of the formula (II):

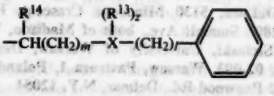


(II)

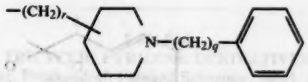
wherein A is



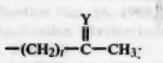
wherein n is an integer from 0 to 2 and $R^{11}$ and $R^{12}$ are the same or different and each is hydrogen, alkyl, alkoxycarbonyl, phenyl, alkoxy, alkoxyalkyl, phenoxy or aralkyloxy, or $R^{11}$ and $R^{12}$ together with the carbon atom to which they are attached form an alkylene group of 3 to 7 carbon atoms when n is 1 and when n is 2, both $R^{11}$ and $R^{12}$ are hydrogen, or two $R^{11}$ form a double bond while $R^{12}$ is hydrogen; $R^7$, $R^8$, $R^9$ and $R^{10}$ are the same or different and each is hydrogen or lower alkyl; $R^2$ is lower alkyl; $R^3$ is hydrogen; a hydrocarbon of 1 to 10 carbon atoms containing 0 to 4 unsaturated bonds unsubstituted or substituted by one or more substituents selected from the group consisting of alkoxy, aryl, aryloxy, aralkyloxy, cycloalkyl, amino, alkylamino, alkylthio, pyridyl, furfuryl and tetrahydrofurfuryl; a group of the formula



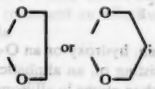
wherein X is nitrogen or oxygen; $R^{13}$ is lower alkyl or lower alkenyl and z is 1 when X is nitrogen and when X is oxygen, z is 0; $R^{14}$ is hydrogen, lower alkyl or phenyl unsubstituted or substituted by alkyl; l is an integer from 0 to 2; m is an integer from 1 to 4; a group of the formula



wherein q is an integer from 0 to 2 and r is an integer from 0 to 2; or a group of the formula



wherein t is 1 or 2 and Y is oxygen,



$R^4$ is lower alkyl; $R^5$ is hydrogen, nitro, cyano, trihalomethyl, dihalo-lower alkoxy, halo, azido, alkoxycarbonyl, aminocarbonyl, sulfamyl or alkylsulfonyl; and $R^6$ is hydrogen, nitro, cyano trihalomethyl, dihalo-lower alkoxy, halo, azido, alkoxycarbonyl, aminocarbonyl, sulfamyl or alkylsulfonyl.

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**5,036,060**

## CYCLOPHOSPHAMIDE

**Abu S. Alam, Libertyville; Fakrul A. A. Sayeed, Mundelein; Kenneth J. Koziol, Bensenville, and John N. Kapoor, Lake Forest, all of Ill., assignors to Fujisawa USA, Inc., Deerfield, Ill.**

**Continuation of Ser. No. 223,919, Jul. 25, 1988, abandoned. This application Nov. 24, 1989, Ser. No. 442,486**

**Int. Cl.[5] A61K** *31/66*

**U.S. Cl. 514—110** **5 Claims**

1. A pharmaceutical composition comprising cyclosphosphamide and sodium chloride as a sterile, lyophilized product wherein (1) the composition is free of mannitol, (2) the relative weight ratio of cyclophosphamide to sodium chloride is about 50–75 parts cyclophosphamide: 20–40 parts sodium chloride, and (3) from about 0.5 to about 1.5 moles of water are present per mole of cyclophosphamide.

5,036,061

## PROCESS FOR THE PREPARATION OF 1 ALPHA,25-DIHYDROXYLATED VITAMIN $D_2$ AND RELATED COMPOUNDS

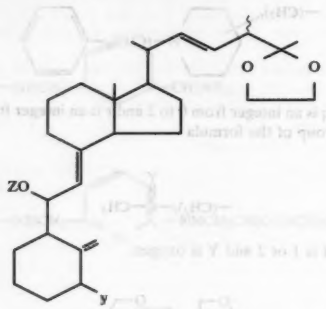
Hector F. DeLuca, 5130 Minocqua Crescent; Heinrich K. Schnoes, 1806 Summit Ave., both of Madison, Wis. 53705; Rafal R. Sicinski, University of Warsaw, Department of Chemistry, 02-093, Warsaw, Pasteura 1, Poland, and Yoko Tanaka, 72 Paxwood Rd., Delmar, N.Y. 12054

Continuation of Ser. No. 862,075, May 12, 1986, abandoned, which is a continuation-in-part of Ser. No. 492,863, May 9, 1983, abandoned. This application Nov. 22, 1989, Ser. No. 442,483

Int. Cl.[5] A61K *31/59;* C07J *9/00*

U.S. Cl. 514—167 16 Claims

1. A compound having the formula



wherein Y is hydrogen, hydroxy or an O-acyl group selected from the group consisting of, an aliphatic acyl group having from 1 to about 6 carbon atoms in all isomeric forms, benzoyl and methyl-halo-or nitro-substituted benzoyl, and residues of dicarboxylic acids having the formulae ROOC $(CH_2)_nCO$— and $ROOCCH_2$—O—$CH_2CO$— where n is an integer from 0 to 4 and Z is an alkyl group having from 1 to about 6 carbon atoms in any of its isomeric forms.

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5,036,062

## NOVEL ESTERS

Bertil V. Hansen; Per-Olov G. Gunnarsson; Henri R. Mollberg, all of Helsingborg, and Sven-Åke Johansson, Ödåkra, all of Sweden, assignors to Pharmacia AB, Uppsala, Sweden

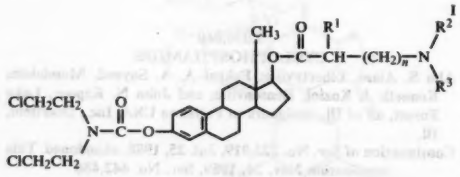
Filed Jun. 13, 1989, Ser. No. 365,436

Claims priority, application Sweden, Jun. 28, 1988, 8802402

Int. Cl.[5] A61K *31/565;* C07J *1/00*

U.S. Cl. 514—176 20 Claims

1. Novel compounds having the general formula



wherein $R^1$, $R^2$ and $R^3$ are selected from the group consisting of hydrogen or lower alkyl having 1–4 carbon atoms, wherein $R^2$ and $R^3$ together with the N atom can also form a ring having 3–6 members and wherein n is 0, 1 or 2, and pharmaceutically acceptable salts thereof.

20. A pharmaceutical composition containing as an active ingredient a compound as set forth in claim 1 and a pharmaceutically acceptable carrier.

5,036,063

## PENEM DERIVATIVES

Rudolf Lattrell, Königstein/Taunus; Walter Dürckheimer, Hattersheim am Main, and Gerhard Seibert, Darmstadt, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

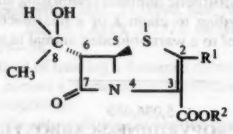
Filed Nov. 24, 1989, Ser. No. 440,797

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1988, 3839987

Int. Cl.[5] C07D *499/00;* A61K *31/43*

U.S. Cl. 514—192 5 Claims

1. A penem derivative of the formula I



or a pharmaceutically tolerable salt thereof, in which

$R^1$ denotes

$C_3$–$C_6$-oxocycloalkyl

$C_3$–$C_6$-(1,1-bis-$C_1$–$C_3$-alkoxy) cycloalkyl

$C_3$–$C_6$-(1,1-$C_2$–$C_3$-alkylenedioxy) cycloalkyl

$C_3$–$C_6$-($C_1$–$C_3$-alkylimino) cycloalkyl

$C_3$–$C_6$-aryliminocycloalkyl (where aryl is equal to phenyl, thienyl or furyl)

$C_3$–$C_6$-hydroxyiminocycloalkyl

$C_3$–$C_6$-($C_1$–$C_3$-alkyloxyimino) cycloalkyl

in which the cycloalkyl radical is unsubstituted, or monosubstituted or disubstituted by $C_1$–$C_3$-alkyl, $C_1$–$C_3$-alkoxy, halogen or methylene

$R^2$ denotes hydrogen

$C_1$–$C_5$-alkanoyloxy-$C_1$–$C_3$-alkyl,

$C_1$–$C_5$-alkoxycarbonyloxy-$C_1$–$C_3$-alkyl,

5-methyl-1,3-dioxolene-2-on-4-yl-methyl phthalidyl

and in which the preferred stereochemistry in position 5 is R, in position 6 is S and in position 8 is R.

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5,036,064

## CEPHALOSPORINS WITH SULFUR-CONTAINING OXYIMINO SIDE CHAIN

Erwin Götschi, Reinach, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

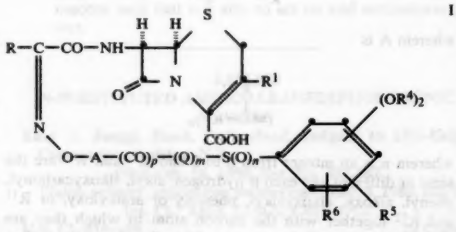
Filed Aug. 9, 1988, Ser. No. 229,960

Claims priority, application Switzerland, Aug. 14, 1987, 3133/87; Dec. 3, 1987, 4726/87

Int. Cl.[5] C07D *501/36;* A61K *31/545*

U.S. Cl. 514—206 49 Claims

1. A compound of the formula



wherein R is a phenyl group or a phenyl group which is mono-, di-, or trisubstituted with halogen, hydroxy, nitro, amino, cyano, trifluoromethyl, lower alkyl or lower alkoxy, a 5-membered aromatic heterocyclic group which has as the hetero (non-carbon) ring member(s) an oxygen or sulphur atom or an imino or lower alkylimino group and optionally one or two nitrogen atoms, or a 6-membered aromatic heterocyclic group,

which has one to three nitrogen atoms as the hetero ring member(s); $R^1$ is $—CH_2—S—R''$ wherein R'' is a monocyclic or bicyclic heterocyclic aromatic group which is unsubstituted or substituted with lower alkyl, lower alkoxy, lower alkanediyl, halogen, trifluoromethyl, hydroxy, oxo, carboxy, lower alkoxycarbonyl, carbamoyl, N-(lower alkyl)carbamoyl), N,N-di(lower alkyl) carbamoyl, amino, lower alkylamino, di(lower alkyl)amino, mercapto, lower alkythio, lower hydroxyalkyl, lower aminoalkyl, lower alkylamino-lower alkyl, di(lower alkyl) amino-lower alkyl, lower carboxyalkyl, carbamoyl-lower alkyl, N-(lower alkyl)carbamoyl-lower alkyl, and N,N-di(lower alkyl)carbamoyl-lower alkyl or sulpho-lower alkyl, A is lower alkylene or $C_{3-7}$-cycloalkylene which is optionally substituted with carboxy, carbamoyl, lower alkylcarbamoyl or di(lower alkyl)carbamoyl; Q is lower alkylene or $C_{3-7}$-cycloalkylene which is optionally substituted with carboxy, carbamoyl, lower alkylcarbamoyl or di(lower alkyl)carbamoyl; or the $—NR^2—$, or $—NR^2NR^3—$; $R^2$ and $R^3$ are independently hydrogen or lower alkyl; p and m are zero or 1; n is zero, 1 or 2; $R^4$ is hydrogen, lower alkanoyl or tri(lower alkyl)-silyl; two $R^4$ groups together represent diphenylmethylene; $R^5$ is hydrogen, lower alkyl, hydroxy, lower alkoxy, halogen, nitro, $—OCOR^7$, $—OCOOR^{71}$, $—N(R^7)_2$, $—NHCOR^7$, $—NHCOOR^{71}$, $—COR^7$, $—SR^7$, $—SOR^7$, $—SO_2R^7$, $—SO_3H$, $—COOR^7$ or $—CON(R^7)_2$, $R^6$ is hydrogen, lower alkyl or halogen, $R^7$ is hydrogen or lower alkyl and $R^{71}$ is lower alkyl, and the two $—OR^4$ groups are attached to the phenyl ring via adjacent carbon atoms, or a 1-(lower alkanoyloxy)-lower alkyl ester, a 1-(lower alkoxycarbonyloxy)lower alkyl ester, a lactonyl ester, a 1-(lower alkoxy)-lower alkyl ester, a 1-(lower alkanoylamino)-lower alkyl ester, a benzyl ester, a cyanomethyl ester or a (2-oxo-1,3-dioxol-4-yl)-methyl ester or pharmaceutically acceptable salt, or a hydrate of any of the foregoing.

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**5,036,065**

## BENZOTHIADIAZEPINE DERIVATIVES

**Kazuo Ogawa, Tokushima, and Yoh-ichi Matsushita, Higashikurume, both of Japan, assignors to Taiho Pharmaceutical Company, Limited, Tokyo, Japan**

**PCT No. PCT/JP89/01069, § 371 Date Jun. 19, 1990, § 102(e) Date Jun. 19, 1990, PCT Pub. No. WO90/04590, PCT Pub. Date May 3, 1990**

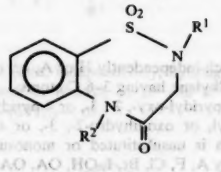
**PCT Filed Oct. 18, 1989, Ser. No. 499,436**

**Claims priority, application Japan, Oct. 20, 1988, 63-264702**

**Int. Cl.[5] A61K *31/55*; C07D *285/36***

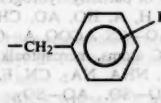
**U.S. Cl. 514—211** **5 Claims**

1. A benzothiadiazepine derivative represented by the formula (1) and pharmaceutically acceptable salt thereof

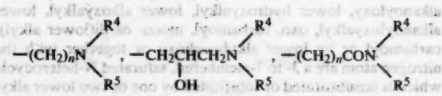


(1)

wherein $R^1$ is lower alkyl or



$R^3$ is hydrogen atom, lower alkoxyl or halogen atom, one or 2 to 3 same or different substituents represented by $R^3$ may be used, $R^2$ is



or $—(CH_2)nCO_2R^6$, n is an integer of 1 to 4, $R^4$ and $R^5$ are same or different and are each hydrogen atom or lower alkyl, $R^4$ and $R^5$ may link together to form a ring and the ring may include oxygen atom or nitrogen atom, $R^6$ is hydrogen atom or lower alkyl.

4. An antiarrhythmic agent comprising an effective amount of a benzothiadiazepine derivative claimed in claim 1 or pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier or excipient.

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**5,036,066**

## TRICYCLIC PYRIDINE DERIVATIVES

**Ulf Fischer, Frenkendrof; Fernand Schneider, Basel, and Ulrich Widmer, Rheinfelden, all of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

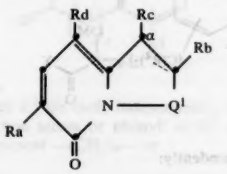
**Division of Ser. No. 141,022, Jan. 5, 1988, Pat. No. 4,889,848, which is a division of Ser. No. 793,511, Oct. 31, 1985, Pat. No. 4,735,940. This application Oct. 16, 1989, Ser. No. 422,397**

**Claims priority, application Switzerland, Nov. 6, 1984, 5304/84; Sep. 5, 1985, 3836/85**

**Int. Cl.[5] A61K *31/55*; C07D *513/12***

**U.S. Cl. 514—211** **10 Claims**

10. A method of treating muscle tension, stress, insomnia, anxiety or convulsions which comprises administering to a host requiring such treatment an effective amount of a compound of the formula



I

wherein $Q^1$ and the nitrogen atom taken together is a group of the formula $>N—CH_2CH_2—S(O)_p—$ or $>N—CH=CH—S-(O)_p—$, p is the integer 0, 1 or 2, Ra is a phenyl, pyridyl or thienyl group unsubstituted or substituted by halogen, trifluoromethyl, nitro, lower alkyl or lower alkoxy, Rb and Rc taken together with the carbon atom denoted by α are a group of the formula $>Cα—S—CH=CH—$ or $>Cα—CH=CH—S—$ unsubstituted or substituted by halogen, trifluoromethyl, lower alkyl, lower alkoxy, nitro, amino or mono- or di(lower alkyl) amino, and the dotted line can be an additional bond, Rd is the group of the formula

wherein $R^1$ is a group of the formula $—NR^3R^4$ or a 5-membered, saturated, partially unsaturated or aromatic heterocycle which is attached via a carbon atom and which is unsubstituted or substituted by one or two lower alkyl groups and which can be substituted by a $(C_{3-6})$-cycloalkyl, hydroxy, lower alkoxy, lower alkanoyloxy, lower hydroxyalkyl, lower alkoxyalkyl, lower alkanoyloxyalkyl, lower alkoxycarbonyl, lower alkanoyl, carbamoyl, mono- or di(lower alkyl)carbamoyl, oxo or lower alkylenedioxy group, $R^3$ and $R^4$ each, independently, is hydrogen, lower alkyl, lower alkoxyalkyl, lower dialkoxyalkyl, lower alkylenedioxyalkyl, lower cyanoalkyl, lower haloalkyl, lower hydroxyalkyl, lower dihydroxyalkyl, lower alkanoyl, lower alkoxycarbonyl or a $(C_{3-7})$-cycloalkyl group which

is unsubstituted or substituted by hydroxy, lower alkoxy, lower alkanoyloxy, lower hydroxyalkyl, lower alkoxyalkyl, lower alkanoyloxyalkyl, oxo, carbamoyl, mono- or di(lower alkyl)-carbamoyl or by lower alkylenedioxy or together with the nitrogen atom are a 3- to 7-membered, saturated N-heterocycle which is unsubstituted or substituted by one or two lower alkyl groups and which can be substituted by one or two hydroxy, lower alkoxy, lower alkanoyloxy, lower hydroxyalkyl, lower alkoxyalkyl, lower alkanoyloxyalkyl, lower alkoxycarbonyl, lower alkanoyl, carbamoyl, mono- or di(lower alkyl)carbamoyl, oxo or lower alkylenedioxy groups and which can contain as a ring member an oxygen or sulfur atom or the group >N—$R^5$, and $R^5$ is hydrogen, lower alkyl, lower hydroxyalkyl, lower alkoxyalkyl, lower alkanoyloxyalkyl, lower alkanoyl, lower alkoxycarbonyl, carbamoyl or mono- or di(lower alkyl) carbamoyl,

or a pharmaceutically acceptable acid addition salt of a compound of formula I which has one or more basic substituents.

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**5,036,067**

## DIBENZOHETEROCYCLIC HYDROXAMIC ACIDS AND HYDROXY UREAS AS INHIBITORS OF 5-LIPOXYGENASE

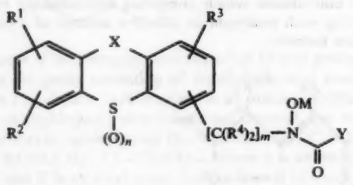
**Yves Girard; Pierre Hamel, and Daniel Delorme, all of Quebec, Canada, assignors to Merck & Co., Inc., Rahway, N.J.**

**Filed Mar. 14, 1990, Ser. No. 493,527**

**Int. Cl.**[5] **A61K** *31/54, 31/55;* **C07D** *279/18, 281/12*

**U.S. Cl. 514—224.8** **9 Claims**

1. A compound having the formula I:



I

wherein:

$R^1$, $R^2$ and $R^3$ are independently:
- a) hydrogen,
- b) lower alkyl,
- c) lower cycloalkyl,
- d) lower alkoxy,
- e) lower alkanoyloxy,
- f) —$CF_3$,
- g) —CN,
- h) —$NO_2$,
- i) —$OR^4$,
- j) —$N(R^4)_2$, —$NCOR^4$, —$N(R^4)CON(R^4)_2$,
- k) —$SR^5$, —$S(O)R^5$, —$S(O)_2R^5$, —$S(O)_2NR^4$,
- l) —$COR^4$, —$COOR^4$, —$CON(R^4)_2$,
- m) halogen;

$R^4$ is:
- a) hydrogen,
- b) $R^5$;

$R^5$ is:
- a) $C_1$–$C_4$ alkyl;

$R^6$ is:
- a) hydrogen,
- b) $C_1$ to $C_4$ alkyl,
- c) —$COR^4$,
- d) —$S(O)_2R^4$,
- e) —$C_1$–$C_4$ [alkyl] alkylene-Ar;

$R^7$ is:
- a) hydrogen,
- b) lower alkyl,
- c) Ar-lower alkyl;

Ar is:
- a) $R^1$ substituted phenyl,
- b) $R^1$ substituted furyl,
- c) $R^1$ substituted thienyl,

X is:
- a) $X^1$,
- b) —CH=CH—,
- c) —$CH_2$—$CH_2$—,
- d) —$CH_2X^1$—,
- e) —$X^1CH_2$—,
- f) —$NR^7$;

$X^1$ is:
- a) O,
- b) S,
- c) S(O),
- d) $S(O)_2$,
- e) $NR^6$;

Y is:
- a) $R^4$,
- b) —$N(R^4)_2$;

M is:
- a) hydrogen,
- b) —COAr,
- c) —CO-alkyl;

m is 1 to 5;

n is 0 to 2;

or a pharmaceutically acceptable salt thereof.

6. A method of treating a mammal suffering from asthmatic, inflammatory, or allergic conditions comprising administration to said mammal of a therapeutically effective amount of a compound of claim 1.

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**5,036,068**

## 4-(PYRIDYL)- AND 4-(OXO-PYRIDYL)-1,3-BENZOXAZINES

**Manfred Baumgarth, Darmstadt; Rolf Gericke, Seeheim; Rolf Bergmann, Reichelsheim; Jacques De Peyer, Pfungstadt, and Ingeborg Lues, Darmstadt, all of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit beschränkter Haftung, Darmstadt, Fed. Rep. of Germany**

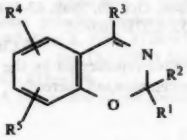
**Filed Nov. 22, 1989, Ser. No. 440,622**

**Claims priority, application Fed. Rep. of Germany, Nov. 26, 1988, 3840011**

**Int. Cl.**[5] **C07D** *413/04, 413/12;* **A61K** *31/535*

**U.S. Cl. 514—230.5** **17 Claims**

1. A benzoxazine derivative of the formula



wherein

$R^1$ and $R^2$ are each independently H or A, or, together, are alternatively alkylene having 3–6 C atoms;

$R^3$ is 2-, 3-, or 4-pyridyl-oxy-, 2-, 3-, or 4-pyridyl-thio, oxo-dihydro-pyridyl, or oxodihydro-2-, 3-, or 4-pyridyl-Z-, each of which is unsubstituted or monosubstituted or disubstituted by A, F, Cl, Br, I, OH, OA, OAc, SH, $NO_2$, $NH_2$, AcNH, HOOC and/or AOOC, and those radicals which are not bonded to the benzoxazine ring via Z can also be completely or partially hydrogenated;

$R^4$ and $R^5$ are each H, A, HO, AO, CHO, ACO, ACS, HOOC, AOOC, AO—CS, ACOO, A—CS—O, hydroxyalkyl having 1–6 C atoms, mercaptoalkyl having 1–6 C atoms, $NO_2$, $NH_2$, NHA, $NA_2$, CN, F, Cl, Br, I, $CF_3$, ASO, $ASO_2$, AO—SO, AO—$SO_2$, AcNH, AO—CO—NH, $H_2NSO$, HANSO, $A_2NSO$, $H_{NSO2}$, $HANSO_2$, $A_2NSO_2$, $H_2NCO$, HANCO, $A_2NCO$, $H_2NCS$, $A_2NCS$, ASONH, $ASO_2NH$, AOSONH, $AOSO_2NH$, ACO-alkyl,

nitroalkyl, cyano-alkyl, A—C(=NOH) or A—C(=NNH$_2$);
Z is O, S or NH;
n is 0 or 1;
A is alkyl having 1–6 C atoms;
-alkyl is alkylene having 1–6 atoms; and
Ac is alkanoyl having 1–8 C atoms or aroyl having 7–11 C atoms;
or a physiologically acceptable salt thereof.

16. A pharmaceutical composition comprising a compound according to claim 1 and a physiologically acceptable carrier.

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**5,036,069**

## ANTHELMINTIC ACTIVE COMPOUND COMBINATIONS

**Peter Andrews; Hubert Dorn, both of Wuppertal, and Herbert Voege, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Continuation of Ser. No. 153,620, Feb. 8, 1988, abandoned. This application Oct. 12, 1989, Ser. No. 420,784**

**Claims priority, application Fed. Rep. of Germany, Feb. 19, 1987, 3705227**

**Int. Cl.$^5$ A01N *43/60***

**U.S. Cl. 514—249** **17 Claims**

1. An anthelmintic composition for use in non-human animals, which comprises a synergistically effective amount against helminths of a combination of a phenylguanidine or benzimidazole compound selected from the group consisting of febantel, oxfendazole, fenbendazole, albendazole, luxbendazole, and flubendazole in admixture with a tetrahydropyrimidine compound which is pyrantel.

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**5,036,070**

## POLYCYCLIC PHENALKYL AMINES AS PSYCHOTROPIC AGENTS

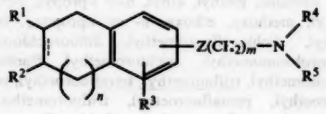
**Magid A. Abou-Gharbia, Glen Mills, Pa., assignor to American Home Products Corporation, New York, N.Y.**

**Filed Jun. 13, 1990, Ser. No. 537,551**

**Int. Cl.$^5$ A61K *31/495, 31/36;* C07D *401/04, 319/20***

**U.S. Cl. 514—252** **13 Claims**

1. A compound having the formula



wherein

$R^1$ and $R^2$ are each, independently, hydrogen, alkyl of 1–6 carbon atoms, or phenyl, or $R^1$ and $R^2$ taken together represent —$(CH_2)_4$— or

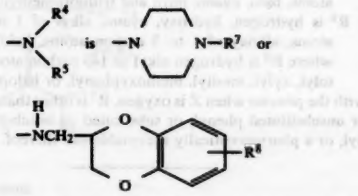
where the dotted line represents an optional double bond;

$R^3$ is hydrogen, alkyl of 1–6 carbon atoms, alkoxy of 1–6 carbon atoms, or halo;

Z is oxygen, or —$N(R^6)$, where $R^6$ is hydrogen or alkyl of 1–6 carbon atoms;

m is 1–4;

n is 0–2;



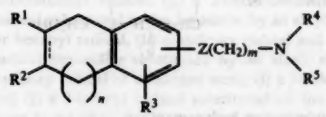
wherein

$R^7$ is unsubstituted or substituted phenyl, 2-pyridinyl, 2-pyrimidinyl, 2-pyrazinyl, 3-pyridazinyl, or diphenylmethyl, where the substituents are selected from the group of alkyl of 1–6 carbon atoms, alkoxy of 1–6 carbon atoms, halo, cyano, nitro and trifluoromethyl;

$R^8$ is hydrogen, hydroxy, cyano, alkyl of 1 to 3 carbon atoms, alkoxy of 1 to 3 carbon atoms, halo, or $NHR^9$ where $R^9$ is hydrogen, alkyl of 1–3 carbon atoms, phenyl, tolyl, xylyl, mesityl, methoxyphenyl, or halophenyl

with the proviso when Z is oxygen, $R^7$ is other than substituted or unsubstituted phenyl, or substituted or unsubstituted pyridyl; or a pharmaceutically acceptable salt thereof.

10. A method of treating a central nervous system disorder in a mammal in need thereof which comprises administering an antipsychotic or anxiolytic amount of a compound having the formula



wherein

$R^1$ and $R^2$ are each, independently, hydrogen, alkyl of 1–6 carbon atoms or phenyl, or $R^1$ and $R^2$ taken together represent —$(CH_2)_4$— or

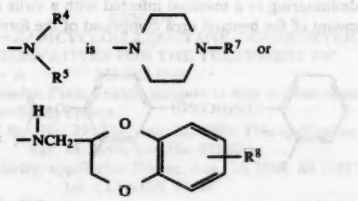
where the dotted line represents an optional double bond;

$R^3$ is hydrogen, alkyl of 1–6 carbon atoms, alkoxy of 1–6 carbon atoms, or halo;

Z is oxygen, or —$N(R^6)$, where $R^6$ is hydrogen or alkyl of 1–6 carbon atoms;

m is 1–4;

n is 0–2;



wherein

$R^7$ is unsubstituted or substituted phenyl, 2-pyridinyl, 2-pyrimidinyl, 2-pyrazinyl, 3-pyridazinyl, or diphenylmethyl, where the substituents are selected from the

group of alkyl of 1–6 carbon atoms, alkoxy of 1–6 carbon atoms, halo, cyano, nitro and trifluoromethyl;

$R^8$ is hydrogen, hydroxy, cyano, alkyl of 1 to 3 carbon atoms, alkoxy of 1 to 3 carbon atoms, halo, or $NHR^9$ where $R^9$ is hydrogen alkyl of 1–3 carbon atoms, phenyl, tolyl, xylyl, mesityl, methoxyphenyl, or halophenyl

with the proviso when Z is oxygen, $R^7$ is other than substituted or unsubstituted phenyl, or substituted or unsubstituted pyridyl; or a pharmaceutically acceptable salt thereof.

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**5,036,071**

**DERIVATIVES OF PURINE**

**Karl N. G. Johansson, Enhörna; Zsuzsanna M. I. Kovacs, Södertälje; Björn G. Lindborg, Älvsjö , and Göran B. Stening, Södertälje, all of Sweden, assignors to Medivir AB, Huddinge, Sweden**

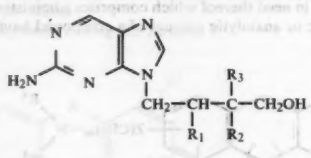
**Continuation-in-part of Ser. No. 22,569, Mar. 9, 1987, abandoned, which is a continuation of Ser. No. 807,853, Dec. 11, 1985, abandoned. This application Jan. 22, 1988, Ser. No. 147,051**

**Claims priority, application Sweden, Dec. 21, 1984, 8406538**

**Int. Cl.[5] C07D *473/18;* A61K *31/52***

**U.S. Cl. 514—261** **23 Claims**

1. A compound of the formula



(I)

wherein

$R_1$ is hydrogen or hydroxymethyl;

$R_2$ is hydrogen, hydroxy or hydroxymethyl;

$R_3$ is hydrogen; or $R_1$ and $R_3$ together constitute an additional carbon-carbon bond;

with the proviso that when $R_1$ is hydrogen then $R_2$ is hydroxy, that when $R_1$ is hydroxymethyl then $R_2$ is hydrogen and that when $R_2$ is hydroxy then $R_1$ is hydrogen; and physiologically acceptable salts, geometric or optical isomers thereof.

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**5,036,072**

**ANTIVIRAL AGENT**

**Tsunetaka Nakajima; Tadao Okamoto; Masahiro Watanabe, and Kazumasa Yokoyama, all of Hirakata, Japan, assignors to Ishihara Sangyo Kaisha Ltd., Osaka, Japan**

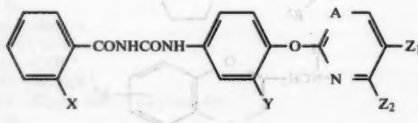
**Filed Jan. 23, 1990, Ser. No. 469,052**

**Claims priority, application Japan, Jan. 24, 1989, 1-15624**

**Int. Cl.[5] A61K *31/505***

**U.S. Cl. 514—274** **8 Claims**

1. A method for the treatment of viral infection comprising: administering to a mammal infected with a virus an effective amount of the benzoyl urea compound of the formula (I)



wherein X is a halogen atom or a nitro group; Y is a hydrogen atom, a halogen atom, a nitro group or a trifluoromethyl group; $Z_1$ is a halogen atom or a trifluoromethyl group; $Z_2$ is a hydrogen atom or a halogen atom; and A is CH or a nitrogen atom.

**5,036,073**

**FUNGICIDAL 4-(4-SUBSTITUTED-PHENYL)-3,3-DIMETHYL-2-(3-PYRIDYL)-BUTAN-2-OL DERIVATIVES**

**Hans-Ludwig Elbe, Wuppertal; Wilhelm Brandes, Leichlingen; Stefan Dutzmann, Duesseldorf, and Gerd Hänssler, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

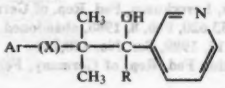
**Division of Ser. No. 226,162, Jul. 29, 1988, abandoned. This application Nov. 28, 1989, Ser. No. 442,042**

**Claims priority, application Fed. Rep. of Germany, Aug. 5, 1987, 3725967; May 7, 1988, 3815700**

**Int. Cl.[5] C07D *213/53, 213/55, 213/28;* A01N *43/40***

**U.S. Cl. 514—277** **6 Claims**

1. A substituted pyridine derivative of the formula



(I)

in which

Ar stands for phenyl which is monosubstituted by identical or different substituents from the group consisting of cyano, nitro, methylthio, ethylthio, trifluoromethylthio, difluoromethylthio, fluoromethylthio, difluorochloromethylthio, dichlorofluoromethylthio, difluoroethylthio, difluorobromomethylthio, trichloromethylthio, trifluoroethylhio, tetrafluoroethylthio, pentafluoroethylthio, trifluorochloroethylthio, trifluorodichloroethylthio, pentachloroethylthio, methylsulphinyi, trifluoromethylsulphinyl, dichlorofluoromethylsulphinyl, difluorochloromethylsulphinyl, fluoromethylsulphinyl, difluoromethylsulphinyl, methylsulphonyl, trifluoromethylsulphonyl, dichlorofluoromethylsulphonyl, dichlorochloromethylsulphonyl, fluoromethylsulphonyl, difluoromethylsulphonyl, methoxycarbonyl, ethoxycarbonyl, methoximinomethyl, ethoximinomethyl, methoximinoethyl, ethoximinoethyl, and phenyl or phenoxy which are in each case optionally monosubstituted, disubstituted or trisubstituted by fluorine or chlorine; or for phenyl which is mono- to trisubstituted by fluorine, chlorine, bromine, methyl, ethyl, n-or i-propyl, n-, i-, s- or t-butyl, methoxy, ethoxy, n- or i-propoxy, trifluoromethyl, dichlorofluoromethyl, difluorochloromethyl, difluorobromomethyl, trichloromethyl, fluoromethyl, difluoromethyl, trifluoroethyl, tetrafluoroethyl, trifluorochloroethyl, pentafluoroethyl, trifluoromethoxy, difluoromethoxy, fluoromethoxy, dichlorofluoromethoxy, difluorochloromethoxy, difluorobromomethoxy, trichloromethoxy, trifluoroethoxy, tetrafluoroethoxy, pentafluoroethoxy, trifluorochloroethoxy, trifluorodichloroethoxy, difluorotrichloroethoxy, or pentachloroethoxy, or stands for $\alpha$-naphthyl or $\beta$-naphthyl;

X is selected from the group consisting of $—CH_2—$, $—O—CH_2$, $—CH_2—O—$, $—O—CH_2—CH_2—$, $—S—CH_2—$, $—CH_2—S—$ and $—S—CH_2—CH_2—$, and

R stands for methyl, ethyl, n- or i-propyl, n-, i-, s- or t-butyl, allyl, propargyl, methoxymethyl, methylthiomethyl, cyclopropyl, chlorophenoxymethyl or chlorophenylthiomethyl,

or a plant-compatible acid or metal salt addition product thereof.

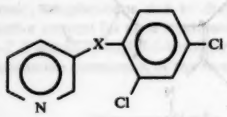
5. A method of combating fungi which comprises applying to such fungi or to a fungus habitat a fungicidally effective amount of a compound or addition product according to claim 1.

## 5,036,074
## CERTAIN 2,4-DICHLORO-PHENYL(LOWERALKYLIDENE) PYRIDINES HAVING FUNGICIDAL ACTIVITY

Hans P. Isenring, Sissach; Beat Zehnder, Reinach, and Hugo Ziegler, Allschwil, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Feb. 20, 1990, Ser. No. 481,264
Claims priority, application Switzerland, Mar. 1, 1989, 747/89
Int. Cl.[5] C07F 5/00; C07D 213/26, 213/61; A01N 43/40
U.S. Cl. 514—277 10 Claims

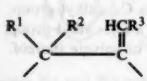
1. A compound of the formula



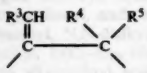

I

wherein

X signifies a group (a) or (b)




(a)




(b)

$R^1$ and $R^2$ signify methyl or together form ethylene,

$R^3$ signifies hydrogen, chlorine, $C_{1-4}$-alkyl or methoxy,

$R^4$ signifies hydrogen or methyl and

$R^5$ signifies methyl or, where $R^4$ signifies hydrogen, also $C_{1-4}$-alkyl, allyl or propargyl or

$R^4$ and $R^5$ together form ethylene,

an N-oxide,N-amino salt or a copper complex of a compound of the formula 1 or an acid addition salt of a compound of the formula 1 or their N-oxide thereof.

9. A method for the control of fungi in agriculture and n horticulture, which method comprises treating the locus to be protected with an effective amount of a compound in accordance with claim 1.

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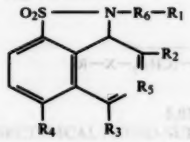
## 5,036,075
## DERIVATIVES OF (AZA) NAPHTHALENSULTAM, THEIR PREPARATION AND COMPOSITIONS CONTAINING THEM

Marie-Thérèse Comte, Chevilly-Larue; Claude Gueremy, Houilles; Jean-Luc Malleron, Marcoussis; Serge Mignani, Livry-Gargan; Jean-Francois Peyronel, Palaiseau, and Alain Truchon, Creteil, all of France, assignors to Rhone-Poulenc Sante, Antony, France

Division of Ser. No. 375,934, Jul. 6, 1989. This application Nov. 6, 1990, Ser. No. 609,506
Claims priority, application France, Jul. 7, 1988, 88 09218; Feb. 20, 1989, 89 02167
Int. Cl.[5] C07D 513/06; A61K 31/47
U.S. Cl. 514—293 5 Claims

1. A compound of formula:




in which

$R_1$ represents

a 1,2,3,6-tetrahydro-1-pyridyl radical substituted in the 4-position by (a) a phenyl radical, (b) a phenyl radical substituted by a halogen atom or an alkyl, hydroxy or alkoxy radical, (c) a 3-indolyl radical, (d) a 3-indolyl radical substituted on the nitrogen atom by an alkyl or alkylcarbonyl radical and/or in the 5-position by a chlorine or fluorine atom or (e) a 3-(5-hydroxyindolyl) radical,

a 1-piperazinyl radical substituted in the 4-position by (a) a phenyl radical, (b) a phenyl radical substituted by an alkoxy, alkyl, hydroxy, nitro or amino radical or a halogen atom, (c) a 1,2-benzisothiazol-3-yl radical, (d) a 1,2-benzisoxazol-3-yl radical or (e) a 2-pyridyl radical,

a piperidino radical substituted in the 4-position by (a phenyl radical, (b) a phenyl radical substituted by a halogen atom or a hydroxy, alkyl or alkoxy radical, (c) two phenyl radicals, (d) a bis(4-fluorophenyl)methylene radical, (e) a 4-fluorobenzoyl radical, (f) a 2-oxo-1-benzimidazolinyl radical, (g) a 2-oxo-1-benzimidazolinyl radical substituted in the 3-position by an alkylcarbonyl or benzoyl radical, (h) a hydroxy radical and a phenyl radical optionally substituted by an alkyl, alkoxy or hydroxy radical or a halogen atom, (i) a 3-indolyl radical, (j) a 3-indolyl radical substituted on the nitrogen atom by an alkyl or alkylcarbonyl radical and/or in the 5-position by a chlorine or fluorine atom or (k) a 3-(5-hydroxyindolyl) radical,

$R_2$, $R_3$ and $R_4$ represent a hydrogen atom and $R_5$ represents a nitrogen atom,

$R_6$ represents an alkylene chain containing 2 to 4 carbon atoms or a propylene chain substituted in the 1- or 3-position by an alkyl radical or in the 2-position by an alkyl, alkoxy, hydroxy, dialkylamino, piperidino, morpholino or thiomorpholino radical,

with the reservation that when $R_6$ represents a propylene radical substituted int he 2-position by a dialkylamino, piperidino, morpholino or thiomorpholino radical, $R_1$ cannot be a radical containing a hydroxy radical and it being understood that the alkyl and alkoxy radicals and the alkyl and alkoxy portions contain 1 to 4 carbon atoms in a straight or branched chain, and its salts with inorganic or organic acids.

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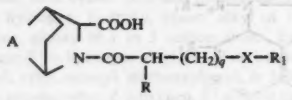
## 5,036,076
## USE OF 2-AZABICYCLO[2.2.2]OCTANE-3-CARBOXYLIC ACID DERIVATIVES FOR THE TREATMENT OF MIGRAINE

Bernard Teisseire, Paris, France, assignor to Adir et Compagnie, Neuilly-sur-Seine, France

Division of Ser. No. 396,864, Aug. 22, 1989. This application Apr. 24, 1990, Ser. No. 513,834
Claims priority, application France, Aug. 24, 1988, 88 11157
Int. Cl.[5] A61K 31/44
U.S. Cl. 514—299 6 Claims

1. A method for the treatment of migraine,

in a patient subject to migraine, comprising the step of administering to said patient an amount of a 2-azabicyclo-[2.2.2]octane compound of Formula I:



(I)

in which

A denotes dimethylene,

q us 0,

R denotes lower-alkyl which can bear an amino group,

X denotes —NH—, and

$R_1$ denotes

wherein $R_2$ denotes hydroxyl or ($C_1$–$C_4$) lower-alkoxy,

$R_3$ denotes ($C_1$–$C_4$) alkyl or phenyl ($C_1$–$C_4$) alkyl

or a pharmaceutically-acceptable salt thereof with a therapeutically-compatible inorganic or organic base or with a therapeutically-compatible inorganic or organic acid,

which is effective for said purpose but essentially devoid of antihypertensive effect.

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**5,036,077**

## 1-(BENZYLPIPERIDINO)PROPAN-2-OL DERIVATIVES, THEIR PREPARATION, THEIR USE AS ANTIMICROBIAL AGENTS AND THE PRODUCTS IN WHICH THEY ARE PRESENT

**Didier Van Broeck, Murviel les Montpellier par Pignan, and Madeleine Mosse, Montpellier, both of France, assignors to Sanofi, Paris, France**

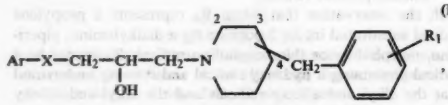
**Filed Sep. 15, 1988, Ser. No. 244,270**

**Claims priority, application France, Sep. 17, 1987, 87 12885**

**Int. Cl.[5] A61K *31/445*; C07D *401/00***

**U.S. Cl. 514—317** **11 Claims**

1. A compound of the formula:



(I)

in which:

Ar represents a phenyl group substituted by $R_2$, $R_3$ and $R_4$, or a naphth-1-yl or naphth-2-yl group, the said naphthyl groups being unsubstituted or substituted by 1 or 2 halogen atoms;

X represents an oxygen atom or a sulfur atom;

$R_1$ represents a hydrogen atom or a halogen atom;

$R_2$ represents a halogen atom, a trifluoromethyl group, a phenyl group which is unsubstituted or substituted by 1 to 3 halogen atoms, a benzyl group which is unsubstituted or substituted by 1 to 3 halogen atoms, a phenoxy group which is unsubstituted or substituted by 1 to 3 halogen atoms, or an alkyl group containing from 1 to 4 carbon atoms;

$R_3$ and $R_4$ represent hydrogen, a halogen atom or an alkyl group containing from 1 to 4 carbon atoms; and

the benzyl group substitutes the piperidino radical in the 2-, 3- or 4-position, or a salt thereof with a mineral or organic acid.

**5,036,078**

## PIPERIDINYL INDOLES FOR MIGRAINE TREATMENT

**Ian H. Coates, Hertford, England, assignor to Glaxo Group Limited, England**

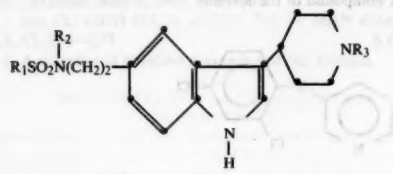
**Filed Aug. 9, 1989, Ser. No. 391,036**

**Claims priority, application United Kingdom, Aug. 10, 1988, 8819024**

**Int. Cl.[5] A61K *31/445*; C07D *401/04***

**U.S. Cl. 514—323** **14 Claims**

1. A compound of formula (I)



(I)

wherein

$R_1$ represents a $C_{1-6}$ alkyl group;

$R_2$ represents a hydrogen atom or a $C_{1-6}$ alkyl group;

$R_3$ represents a hydrogen atom or a $C_{1-3}$ alkyl group; or a pharmaceutically acceptable salt or solvate thereof.

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**5,036,079**

## HYPOGLYCEMIC THIAZOLIDINEDIONE DERIVATIVES

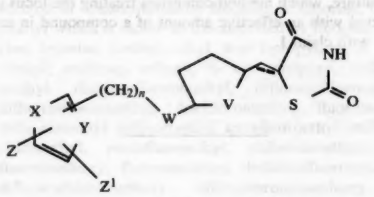
**David A. Clark, East Lyme; Steven W. Goldstein, Mystic, and Bernard Hulin, Essex, all of Conn., assignors to Pfizer Inc., New York, N.Y.**

**Continuation-in-part of Ser. No. 438,490, Dec. 7, 1989, abandoned. This application Feb. 8, 1990, Ser. No. 477,261**

**Int. Cl.[5] C07D *401/14, 403/14, 417/06*; A61K *31/44***

**U.S. Cl. 514—333** **24 Claims**

1. A compound of the formula



(I)

wherein the dotted line represents a bond or no bond;

V is —CH=CH—, —N=CH—, —CH=N—or S;

W is $CH_2$, CHOH, CO or CH=CH;

X is —CH=N—or —N=CH—;

Y is CH

Z is hydrogen, ($C_1$–$C_7$)alkyl, or ($C_3$–$C_4$)cycloalkyl;

$Z^1$ is hydrogen or ($C_1$–$C_3$)alkyl;

R and $R^1$ are each independently hydrogen or methyl; and

n is 1, 2 or 3;

a pharmaceutically acceptable cationic salt thereof; or a pharmaceutically acceptable acid addition salt thereof when the compound contains a basic nitrogen.

21. A method of lowering the blood cholesterol in a hypercholesterolemic mammal which comprises administering to said mammal a blood cholesterol lowering effective amount of a compound of claim 1.

5,036,080

## (D)-6-FLUORO-2,3-DIHYDRO-2',5-DIOXO-SPIRO[4H-1-BENZOPYRAN-4,4'-IMIDAZOLIDE]-2-CARBOXAMIDE COMPOUNDS

Masayasu Kurono; Toshinao Usui; Kenji Miura; Yasuaki Kondo, and Kiichi Sawai, all of Aichi, Japan, assignors to Sanwa Kagaku Kenyusho Co., Ltd., Aichi, Japan

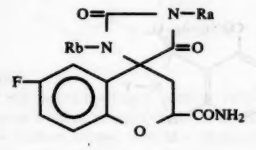
Filed Mar. 31, 1989, Ser. No. 331,329

Claims priority, application Japan, Apr. 7, 1988, 63-84098; Nov. 28, 1988, 63-298220

Int. Cl.[5] A61K *31/415;* C07D *491/107*

U.S. Cl. 514—333 3 Claims

2. A pharmaceutical composition for the treatment of chronic complications due to diabetes, which comprises an effective amount for such treatment of a (d)-6-fluoro-2,3-dihydro-2',5'-dioxo-spiro[4H-1-benzopyran-4,4'-imidazolidine]-2-carboxamide compound of the formula



wherein Ra and Rb are the same or different, each being hydrogen, alkanoyl, cyclohexanoyl, aroyl, furoyl, nicotinoyl alkoxycarbonyl, aralkoxycarbonyl, aryloxycarbonyl, N-alkylcarbamoyl, N,N-dialkylcarbamoyl, N-aralkylcarbamoyl, alkoxyalkyl, 1-($C_1$–$C_{10}$ alkanoyl)alkyl, alkylmercapto, arylmercapto, alkylsulfinyl, arylsulfinyl, alkylsulfonyl or arylsulfonyl, wherein aroyl and aryl may be substituted by chloro, methoxy or methyl, with the proviso that both of Ra and Rb are not concurrently hydrogen; and a pharmaceutically acceptable carrier therefor.

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5,036,081

## CALCIUM ABSORPTION PROMOTER

Takao Matsuo, Kyoto; Hiroyuki Odaka, Osaka; Tsuyoshi Suzuki, and Masao Tsuda, both of Hyogo, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

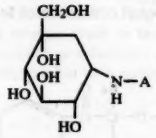
Filed Aug. 22, 1989, Ser. No. 396,696

Claims priority, application Japan, Aug. 22, 1988, 63-207724

Int. Cl.[5] A61K *31/44, 31/70, 31/38, 31/34, 31/16, 31/135, 31/13*

U.S. Cl. 514—336 4 Claims

1. A method for promoting calcium absorption which comprises administering orally an effective inhibiting amount of an α-glucosidase inhibitor substance to a mammal in need thereof, wherein said inhibitor substance is a compound of the formula:



wherein A is selected from the group consisting of:

a $C_1$–$C_{10}$ acyclic hydrocarbon group which is unsubstituted or substituted by at least one member selected from the group consisting of hydroxyl, phenoxy, thienyl, furyl, pyridyl, cyclohexyl, phenyl, $C_{1-6}$-alkylphenyl, $C_{1-6}$-alkoxyphenyl, halophenyl and biphenyl;

a $C_5$–$C_6$ cyclic hydrocarbon group which is unsubstituted or substituted by at least one member selected from the group consisting of hydroxyl, hydroxymethyl, methyl and amino; and

a sugar residue.

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5,036,082

## INSECTIDICAL NITRO-SUBSTITUTED HETEROCYCLIC COMPOUNDS

Kozo Shiokawa, Kanagawa; Shinichi Tsuboi, Tokyo; Shoko Sasaki, Tokyo; Koichi Moriya, Tokyo; Yumi Hattori, Tokyo, and Katsuhiko Shibuya, Tokyo, all of Japan, assignors to Nihon Tokushu Noyaku Seizo K. K., Tokyo, Japan

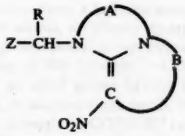
Division of Ser. No. 353,370, May 17, 1989, Pat. No. 4,960,780, which is a division of Ser. No. 208,421, Jun. 17, 1988, Pat. No. 4,876,263. This application Apr. 18, 1990, Ser. No. 510,509

Claims priority, application Japan, Jun. 26, 1987, 62-157528

Int. Cl.[5] A61K *31/44, 31/425;* C07D *513/04, 487/04*

U.S. Cl. 514—338 6 Claims

1. A nitro-substituted heterocyclic compound of the formula (I)



(I)

wherein

R is hydrogen or $C_1$–$C_4$ alkyl,

Z is $C_6$–$C_{10}$ aryl, or a 5 to 6-membered heterocylic group containing 1 to 2 hetero atoms selected from the group consisting of O, S and N, at least one of which is a nitrogen atom, and said aryl and heterocyclic group is unsubstituted or substituted respectively by one or two members selected from the group consisting of halogen, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ haloalkyl, $C_1$–$C_4$ alkylthio, $C_1$–$C_4$ haloalkoxy, $C_1$–$C_4$ haloalkylthio, nitro, and cyano,

A is ethylene which may be substituted by methyl, and

B stands for 2 members of a heterocyclic ring which is formed, together with the adjacent C-atom and N-atom, and at least one of said members represents a nitrogen atom or a sulfur atom and the members of B are unsubstituted or substituted by at least one substituent selected from the group consisting of halogen, $C_1$–$C_6$ alkyl, $C_1$–$C_4$ alkoxy,

alkoxycarbonyl having 1 to 4 carbon atoms in the alkoxy part, unsubstituted or substituted $C_6$–$C_{10}$ aryl, keto, imino, phenoxy,

$C_1$–$C_4$-alkylthio, alkoxycarbonylimino having 1 to 4 carbon atoms in the alkoxy part, phenoxycarbonylimino, benzoylimino, benzyl, cyano, thioketo, hydroxy and $C_1$–$C_2$ alkylidene.

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5,036,083

## HETEROCYCLIC AGENTS

Pierre A. R. Bruneau, Ludes, France, assignor to ICI Pharma, France and Imperial Chemical Industries PLC, England

Filed Jun. 30, 1989, Ser. No. 373,494

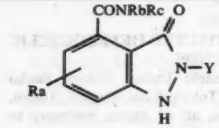
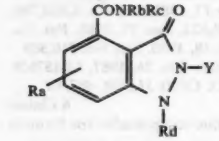
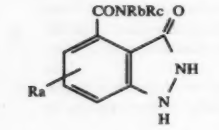
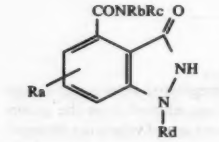
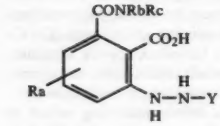
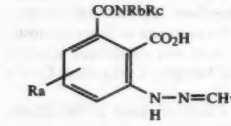
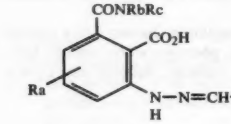
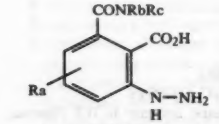
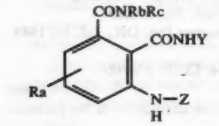
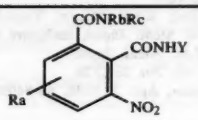
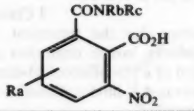
Claims priority, application European Pat. Off., Jul. 15, 1988, 88401845

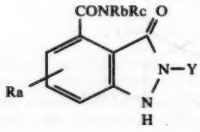
Int. Cl.[5] A61K *31/44;* C07D *473/00*

U.S. Cl. 514—338 7 Claims

1. A 1,2-dihydro-3H-indazol-3-one derivative of the formula I

-continued

| | Chemical Formulae |
|---|---|
|  | I |
|  | II |
|  | III |
|  | IV |
|  | V |
|  | VIa |
|  | VIb |
|  | VII |
|  | VIII |
|  | IX |
|  | X |



I

Ra is hydrogen, haogeno, hydroxy, cyano, Trifluoromethyl, (1–6C)alkyl or (1–6C)aloxy;

Rb is hydrogen or (1–6C) alkyl;

Rc is hydrogen, (1–8C)alkyl or (3–8C)alkenyl; and

Y is a group of the formula A–Q in which A is (1–6C)alkylene or (3–6C)alkeneylene, and Q is pyridyl, which may optionally ear one or two substitutents selected from halogeno, hydroxy, cyano, trifuloromethyl, amino, nitro, (1–6C)alkyl, (1–6C)alkoxy, (1–6C)alkylamino, di[(1–4C-)alkyl]amino or (2–6C)alkanoylamino,

or a pharmaceutically-acceptable salt thereof;

or a 1-(1–4C)alkoxycarbonyl derivative thereof.

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**5,036,084**

## CERTAIN 1-(3-PYRIDYL)-2-PHENOXY-ALKANONES HAVING ANTI-MICROBIAL ACTIVITY

**Hans Tobler, Allschwil; Peter Ackermann, Pfeffingen, and Robert Nyfeler, Basel, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

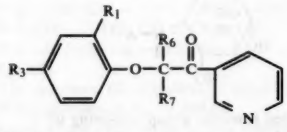
**Continuation of Ser. No. 237,659, Aug. 23, 1988, abandoned, which is a continuation of Ser. No. 912,900, Sep. 26, 1986, abandoned. This application Dec. 21, 1989, Ser. No. 456,057**

**Claims priority, application Switzerland, Oct. 1, 1985, 4245/85**

**Int. Cl.**[5] **C07D** *213/46;* **A01N** *43/40*

**U.S. Cl. 514—355** **7 Claims**

**1**. A pyridinyl carbonyl compound of formula I



(I)

wherein

$R_1$ and $R_3$ are each independently hydrogen, halogen, $C_1$–$C_4$alkyl or trifluoromethyl;

$R_6$ and $R_7$ are each independently hydrogen or $C_1$–$C_4$alkyl.

**5**. A composition for controlling microorganisms or for preventing attack by said microorganisms, which composition consists essentially of an effective amount of a compound of formula I according to claim **1**, together with a suitable carrier.

5,036,085

## PESTICIDAL THIADIAZOLE-SUBSTITUTED ACRYLIC ACID ESTERS AND INTERMEDIATES THEREFOR

Ulrich Heinemann, Leichlingen; Gerd Kleefeld; Stefan Dutzmann, both of Duesseldorf, and Gerd Hänssler, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

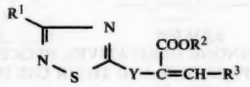
Filed Mar. 19, 1990, Ser. No. 495,528

Claims priority, application Fed. Rep. of Germany, Mar. 31, 1989, 3910358

Int. Cl.[5] C07D *285/08;* A61K *31/41*

U.S. Cl. 514—361 13 Claims

1. A thiadiazole-substituted acrylic acid ester of the formula



(I)

in which

$R^1$ represents hydrogen, methyl, ethyl, n- or i-propyl, n-, i-, s- or t-butyl, straight-chain or branched alkyl having 1 to 4 carbon atoms, which is monosubstituted to hexasubstituted by identical or different substituents from the group consisting of fluorine and chlorine, or straight-chain or branched alkyl having 1 to 4 carbon atoms which is substituted by phenylthio or phenyloxy which in each case are unsubstituted or monosubstituted to trisubstituted by identical or different substituents, the phenyl substituents being the substituents mentioned below in the definition of $R^1$ or;

$R^1$ represents allyl, n- or i-butenyl, or benzyl, phenylethyl, phenylethenyl, phenyl, naphthyl, pyridyl, thienyl or furyl in each case optionally monosubstituted to trisubstituted in the aryl moiety or in the heteroaryl moiety by identical or different substituents selected from the group consisting of fluorine, chlorine, bromine, cyano, nitro, methyl, ethyl, n- or i-propyl, n-, i-, s- or t-butyl, methoxy, ethoxy, n- or i-propoxy, methylthio, trifluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio, methoxycarbonyl, ethoxycarbonyl, methoximinomethyl, ethoximinomethyl, methoximinoethyl, ethoximinoethyl, cyclopentyl, cyclohexyl, 1,3-propanediyl, but-2-ene-di-1,4-yl, 1,4-butanediyl, and phenyl, benzyl, phenoxy or benzyloxy in each case unsubstituted or monosubstituted to trisubstituted in the phenyl moiety by identical or different substituents from the group consisting of fluorine, chlorine, bromine, methyl, ethyl, methoxy, ethoxy, methylthio, trifluoromethyl, difluoromethoxy, trifluoromethoxy and trifluoromethylthio,

$R^2$ represents methyl, ethyl, n- or i-propyl, n-, i-, s- or t-butyl,

$R^3$ represents dialkylamino each having 1 to 4 carbon atoms in the individual straight-chain or branched, identical or different alkyl moieties or a radical —Z—$R^4$,

Y represents oxygen, sulphur or a radical

$R^4$ represents methyl, ethyl, n- or i-propyl, n-, i-, s- or t-butyl or benzyl which is unsubstituted or monosubstituted to trisubstituted by identical or different substituents as those mentioned for $R^1$;

$R^5$ represents hydrogen, methyl, ethyl, n- or i-propyl, n-, i-, s- or t-butyl and

Z represents oxygen or sulphur.

5,036,086

## NOVEL BENZOTHIAZOLE DERIVATIVES

Hiroaki Taguchi, Ibaraki; Takeo Katsushima, Kyoto; Masakazu Ban, Mukoh; Mitsuru Takahashi, Otsu; Kiyotaka Shinoda, Otsu, and Akihiko Watanabe, Otsu, all of Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

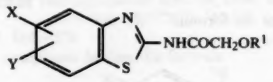
Filed Mar. 30, 1990, Ser. No. 501,727

Claims priority, application Japan, May 11, 1989, 1-118146

Int. Cl.[5] C07D *277/82;* A61K *31/425*

U.S. Cl. 514—367 4 Claims

1. A benzothiazole derivative of the formula (I):



(I)

wherein $R^1$ is hydrogen atom, or an acyl group selected from the group consisting of an alkanoyl group having 2 to 10 carbon atoms, a cycloalkylcarbonyl group having 6 to 8 carbon atoms, a dibasic carboxyl group having 2 to 4 carbon atoms and benzoyl; X and Y are the same or different and are each hydrogen atom, a halogen atom, an alkyl group having 1 to 6 carbon atoms, an alkoxy group having 1 to 6 carbon atoms, nitro group, amino group, cyano group, trifluoromethyl group, a group of the formula: —$COOR^2$ (wherein $R^2$ is hydrogen atom, an alkyl group having 1 to 6 carbon atoms, an alkali metal, an alkaline earth metal, or a cation of amine), or a group of the formula: —$CONR^3R^4$ (wherein $R^3$ and $R^4$ are the same or different and are each hydrogen atom or an alkyl group having 1 to 6 carbon atoms), or a pharmaceutically acceptable acid addition salt thereof.

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5,036,087

## CLATHRATE COMPOUND

Hideo Sugi; Ayako Sekikawa, and Ryoichi Takahashi, all of Tokyo, Japan, assignors to Kurita Water Industries, Ltd., Tokyo, Japan

Filed Jan. 10, 1989, Ser. No. 295,627

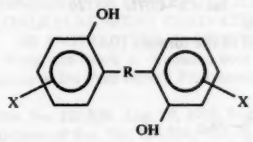
Claims priority, application Japan, Jan. 26, 1988, 63-15426

Int. Cl.[5] A61K *31/41*

U.S. Cl. 514—372 2 Claims

1. A clathrate compound comprising 5-chloro-2-methyl-4-isothiazoline-3-one, and at least one of (a) a bisphenol compound represented by formula (I) and (b) deoxycholic acid represented by formula (II):

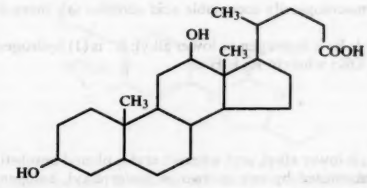
(a) bisphenol compound



(I)

where X is a halogen atom, and R is a methylene, ethylidene, propylidene or isopropylidene group;

(b) deoxycholic acid



(II)

## 5,036,088
## ANTIALLERGY AND ANTIINFLAMMATORY AGENTS, COMPOSITIONS AND USE

**Yoshihiko Kitaura; Fumitaka Ito; Rodney W. Stevens, and Nobuko Asai, all of Aichi, Japan, assignors to Pfizer Inc., New York, N.Y.**

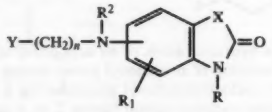
**Division of Ser. No. 427,161, Oct. 25, 1989, Pat. No. 5,006,541, which is a continuation-in-part of Ser. No. 51,873, May 18, 1987, abandoned. This application Dec. 3, 1990, Ser. No. 620,959**

**Claims priority, application Japan, Jun. 9, 1986, 61-133470; Jun. 8, 1987, 62-142779**

**Int. Cl.[5] C07D** *235/26, 263/58*

**U.S. Cl. 514—375** **11 Claims**

1. A compound of the formula



or a pharmaceutically acceptable acid addition salt thereof, wherein R is hydrogen, alkyl having one to three carbon atoms, benzyl or carboxymethyl; $R_1$ is acetoxy, thiophenoxy, hydrogen, fluoro, chloro, methoxy, methyl or trifluoromethyl; $R_2$ is hydrogen, alkyl having one to three carbon atoms, alkanoyl having one to three carbon atoms or benzyl; X is NH, or O; n is an integer of 1 to 7; and Y is styryl, methyl, N-methylphenylamino, N-benzylphenylamino, phenylamino, phenoxy, thiophenoxy, thienyl, furyl, pyridyl, phenyl, substituted phenyl wherein said substituent is methyl, dimethylamino, methoxy, fluoro or chloro, or disubstituted phenyl wherein said substituents are each chloro, hydroxy or methoxy with the proviso that when Y is phenoxy, thiophenoxy, phenylamino, N-methylphenylamino or N-benzylphenylamino n is 2–7.

11. A method for treating an allergic or inflammatory condition in a mammal which comprises administering to said mammal an antiallergy or anti-inflammatory effective amount of a compound according to claim 1.

## 5,036,089
## 2-OXAZOLIDINONE DERIVATIVES OF NITROIMIDAZOLES AND PHARMACEUTICAL COMPOSITIONS USEFUL AS SENSITIZING AGENTS

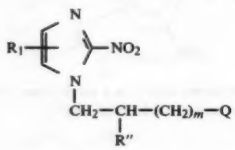
**Mark J. Suto, Ann Arbor, Mich., assignor to Warner-Lambert Company, Morris Plains, N.J.**

**Division of Ser. No. 274,209, Nov. 25, 1988, Pat. No. 4,954,515. This application Jun. 4, 1990, Ser. No. 534,086**

**Int. Cl.[5] C07D** *263/20*

**U.S. Cl. 514—376** **11 Claims**

1. A compound of the formula (I)

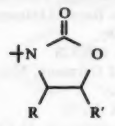


I

and a pharmacologically acceptable acid addition salt thereof; wherein

m is 0 or 1; $R_1$ is hydrogen or lower alkyl; R'' is (1) hydrogen or (2) $OR_3$ wherein $R_3$ is H or

wherein $R_4$ is lower alkyl, aryl wherein aryl is phenyl unsubstituted or substituted by one or two of lower alkyl, halogen, trifluoromethyl, hydroxy, lower alkoxy, nitro, amino, monoalkyl, or dialkylamino, or aralkyl wherein aralkyl is aryl as defined above attached through an alkylenyl of from one to four straight or branched carbon chain; and Q is (1)



(I)

wherein R and R'' are independently hydrogen; lower alkyl; aryl as defined above, or aralkyl as defined above;

with the proviso that m is 0 or 1 when R'' is hydrogen; and m is 1 when R'' is $OR_3$.

## 5,036,090
## 3-ARYLOXAZOLIDINONE DERIVATIVES, PROCESS FOR THEIR PREPARATION AND THEIR USE IN THERAPY

**Francois X. Jarreau, Versailles; Vincenzo Rovei, Rueil Malmaison; Jean-Jacques Koenig, Maisons Laffitte, and Alain R. Schoffs, Paris, all of France, assignors to Delalande S.A., Courbevoie, France**

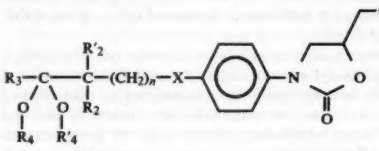
**Filed Oct. 15, 1990, Ser. No. 597,426**

**Claims priority, application France, Oct. 17, 1989, 89 13555**

**Int. Cl.[5] C07D** *263/24;* **A61K** *31/42*

**U.S. Cl. 514—376** **9 Claims**

1. The derivatives of the formula:



(I)

where:

$R_1$ is H or $C_1$–$C_4$ alkyl;

X is an oxygen atom, a methylene group or a —CH=CH— group;

n is 1 or 2 when X is an oxygen atom or a methylene group and is 0 or 1 when X is a —CH=CH—group;

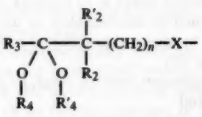
$R_3$ is a $C_1$–$C_4$ alkyl, $C_3$–$C_7$ cycloalkyl, phenyl, benzyl, $CHF_2$, $CF_3$ or $CF_3CF_2$ group;

each of $R_2$ and $R'_2$ independently is a hydrogen atom or a $C_1$–$C_4$ alkyl, $C_4$–$C_7$ cycloakly, phenyl or benzyl group;

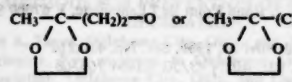
$R'_2$ and $R_3$ may further form together a —$(CH_2)_3$— or —$(CH_2)_4$— chain; and

each of $R_4$ and $R'_4$ independently is a $C_1$–$C_4$ alkyl group or $R_4$ and $R'_4$ form together either a —$(CH_2)_2$— or —$(CH_2)_3$— chain, a —$(CH_2)_2$— or —$(CH_2)_3$— chain substituted by one or two $C_1$–$C_4$ alkyl groups, or a —$(CH_2)_2$— chain substituted by one or two —$CH_2$—$NH_2$ groups or by one or two —$CH_2$—$NH_2$ groups N-substituted by one or two $C_1$–$C_4$ alkyl groups,

these derivatives being under the form of diastereoisomers or enantiomers or under the cis- or trans-form or under the form of a mixture of all theses forms, including the racemic forms, with the exclusion of the racemates wherein $R_1$=$CH_3$ and the

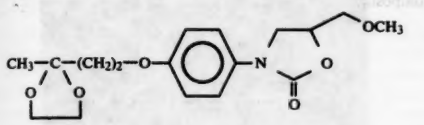


chaining has the meaning:

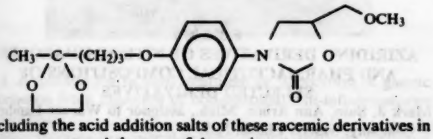


and the optional acid addition salts of said derivatives.

9. The method of use of the compounds according to any one of claims 1 to 7 and of the racemic derivatives of formula:



or



including the acid addition salts of these racemic derivatives in the treatment and therapy of depressive states.

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## 5,036,091

## 3-ARYLOXAZOLIDINONE DERIVATIVES, PROCESS FOR THEIR PREPARATION AND THEIR USE IN THERAPY

**Francois X. Jarreau, Versailles; Vincenzo Rovei, Rueil Malmaison; Jean-Jacques Koenig, Maisons Laffitte, and Alain R. Schoffs, Paris, all of France, assignors to Delalande S.A., Courbevoie, France**

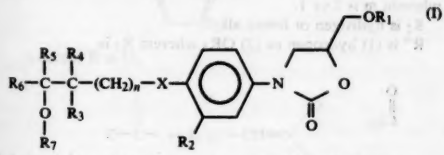
**Filed Oct. 15, 1990, Ser. No. 597,583**

**Claims priority, application France, Oct. 17, 1989, 8913555**

**Int. Cl.[5] C07D *263/24*; A61K *31/42***

**U.S. Cl. 514—376** **9 Claims**

1. The derivatives of the formula:



(I)

wherein:

$R_1$ is H or $C_1$–$C_4$ alkyl;

X is either an oxygen atom, in which case $R_2$ = H or halogen, or a methylene group or a —CH=CH— group, in which case $R_2$ = H;

n is 1 or 2 when X is an oxygen atom or a methylene group and 0 or 1 when X is a —CH=CH— group;

each of $R_3$ and $R_4$ is independently H, $C_1$–$C_4$ alkyl $C_4$–$C_7$ cycloalkyl, phenyl or benzyl;

$R_5$ is H or $C_1$–$C_4$ alkyl;

$R_6$ is $C_1$–$C_4$ alkyl, $CHF_2$, $CF_3$, $CF_3CF_2$, $C_1$–$C_4$ cycloalkyl, phenyl or benzyl;

$R_4$ and $R_6$ may further form together a —$(CH_2)_3$— or —$(CH_2)_4$— chain;

$R_5$ and $R_6$ may further form together a —$(CH_2)_4$— or —$(CH_2)_5$— chain; and

$R_7$ is H, $C_1$–$C_4$ alkyl, $C_2$–$C_5$ acyl or benzyl, these derivatives being under the form of diastereoisomers or enantiomers or under the cis- or trans-form or under the form of a mixture of all theses forms, including the racemic forms.

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## 5,036,092

## AMINOMETHYL OXOOXAZOLIDINYL AZACYCLOALKYLBENZENE DERIVATIVES USEFUL AS ANTIBACTERIAL AGENTS

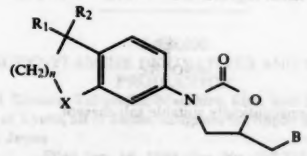
**Chia-Lin J. Wang, and Mark A. Wuonola, both of Wilmington, Del., assignors to Du Pont Merck Pharmaceutical, Wilmington, Del.**

**Division of Ser. No. 233,828, Sep. 19, 1988, Pat. No. 4,921,869, which is a division of Ser. No. 106,358, Oct. 9, 1987, Pat. No. 4,801,600. This application Mar. 15, 1990, Ser. No. 497,215**

**Int. Cl.[5] C07D *263/24***

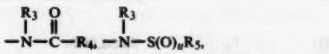
**U.S. Cl. 514—376** **21 Claims**

1. A compound having the formula



(I)

wherein for the l isomer or racemic mixtures containing it B is $NH_2$,



or $N_3$;

u is 1 or 2;

$R_3$ is H, alkyl of 1–10 carbon atoms, or cycloalkyl of 3–8 carbon atoms;

$R_4$ is H, alkyl of 1–4 carbon atoms, alkenyl of 2–4 carbon atoms, cycloalkyl of 3–4 carbon atoms, or $OR_5$;

$R_5$ is alkyl of 1–4 carbon atoms;

X is $NR_6$;

$R_6$ is H or alkyl of 1–4 carbon atoms;

n is 1–2; and

$R_1$ and $R_2$ taken together are $H_2$, H and OH, =O, H and $N(R_6)_2$;

or a pharmaceutically suitable salt thereof.

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## 5,036,093

## AMINOMETHYL OXOOXAZOLIDINYL AZACYCLOALKYLBENZENE DERIVATIVES USEFUL AS ANTIBACTERIAL AGENTS

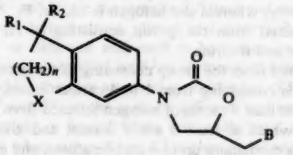
**Chia-Lin J. Wang, and Mark A. Wuonola, both of Wilmington, Del., assignors to Du Pont Merck Pharmaceutical, Wilmington, Del.**

**Division of Ser. No. 233,828, Aug. 19, 1988, Pat. No. 4,921,869, which is a division of Ser. No. 106,358, Oct. 9, 1987, Pat. No. 4,801,600. This application Mar. 15, 1990, Ser. No. 497,214**

**Int. Cl.[5] C07D *263/24***

**U.S. Cl. 514—376** **21 Claims**

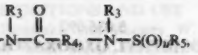
1. A compound having the formula



(I)

wherein for the l isomer or racemic mixtures containing it

B is $NH_2$;



or $N_3$;

u is 1 or 2;

$R_3$ is H, alkyl of 1–10 carbon atoms, or cycloalkyl of 3–8 carbon atoms;

$R_4$ is H, alkyl of 1–4 carbon atoms, alkenyl or 2–4 carbon atoms, cycloalkyl of 3–4 carbon atoms, or $OR_5$;

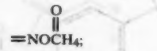
$R_5$ is alkyl of 1–4 carbon atoms;

X is $NR_6$;

$R_6$ is H or alkyl of 1–4 carbon atoms;

n is 1–3; and

$R_1$ and $R_2$ taken together are =NOH, $=NOR_5$ or



to a pharmaceutically suitable salt thereof.

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5,036,094

## AZOLYL-DERIVATIVES ENDOWED WITH ANTIFUNGAL ACTIVITY

Roberto Colle; Giovanni Camaggi; Franco Gozzo; Giuseppina Ratti; Luigi Mirenna, and Carlo Garavaglia, all of Milan, Italy, assignors to Montedison S.p.A., Milan, Italy

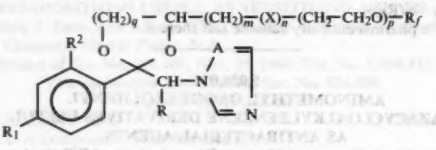
Continuation of Ser. No. 911,217, Sep. 24, 1986, abandoned. This application Sep. 18, 1989, Ser. No. 408,945

Claims priority, application Italy, Nov. 4, 1985, 22705 A/85

Int. Cl.[5] A01N *43/653;* C07D *405/06, 249/08*

U.S. Cl. 514—383 6 Claims

1. Compound having the formula:



(I)

in their stereochemical isomer form, wherein:

m=0, 1, 2; n=0, 1 with the condition that when m=0, also n=0;

p=0; q=1, 2;

X is either oxygen or sulphur;

A=N;

R is H, $CH_3$, F;

$R_1$ is selected from the group consisting of chlorine, bromine, fluorine, $CF_3$, phenyl, $C_1$–$C_2$-alkoxy and $C_1$–$C_2$-haloalkoxy, wherein the halogen is Cl, Br, F;

$R_2$ is selected from the group consisting of H, chlorine, bromine and fluorine;

$R_f$ is selected from the group consisting of the group formed by alkyls containing from 1 to 4 carbon atoms, and containing at least 4 atoms of halogen selected from F, Cl and Br, of which at least 3 are F atoms; and alkenyls and alkynyls containing up to 4 carbon atoms, and containing halogen atoms selected from F Cl and Br of which at least 2 are F atoms.

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5,036,095

## THERAPEUTIC USE OF DMDM HYDANTOIN

Guy Andermann, 2, Rond Point de l'Esplanade, F 67000 Strasbourg, France

Filed Nov. 14, 1989, Ser. No. 436,216

Int. Cl.[5] A01N *43/50;* C10M *105/08*

U.S. Cl. 514—389 6 Claims

1. A method for the treatment of acne in humans comprising the topical administration to said human of effective amount of DMDM Hydantoin in association with a topical pharmaceutical carrier, DMDM Hydantoin is provided in concentrations ranging from about 0.10% to about 5.0% by weight of the composition.

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5,036,096

## AZIRIDINO DERIVATIVES OF NITROIMIDAZOLES AND PHARMACEUTICAL COMPOSITIONS OF SELECTED DERIVATIVES

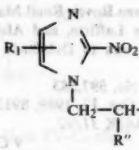
Mark J. Suto, Ann Arbor, Mich., assignor to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 274,209, Nov. 25, 1988, Pat. No. 4,954,515. This application Jun. 4, 1990, Ser. No. 532,529

Int. Cl.[5] C07D *233/91*

U.S. Cl. 514—398 7 Claims

1. A compound of the formula (I)



(I)

and a pharmacologically acceptable acid addition salt thereof; wherein m is 0 or 1;

$R_1$ is hydrogen or lower alkyl;

R'' is (1) hydrogen or (2) $OR_3$ wherein $R_3$ is

wherein $R_4$ is lower alkyl, aryl wherein aryl is phenyl unsubstituted or substituted by one or two of lower alkyl, halogen, trifluoromethyl, hydroxy, lower alkoxy, nitro, amino, monoalkyl, or dialkylamino, or aralkyl wherein aralkyl is aryl as defined above attached through an alkylenyl of from one to four straight or branched carbon chain;

and Q is (3)

wherein R and R' are independently hydrogen; lower alkyl, aryl as defined above, or aralkyl as defined above; with the proviso that m is 0 or 1 when R'' is hydrogen; and m is 1 when R'' is $OR_3$.

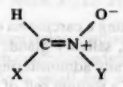
## 5,036,097
## PHENYLBUTYL NITRONE COMPOSITIONS AND METHODS FOR PREVENTION OF GASTRIC ULCERATION

**Robert A. Floyd, Oklahoma City, Okla., and John M. Carney, Lexington, Ky., assignors to Oklahoma Medical Research Foundation, Oklahoma City, Okla. and University of Kentucky Research Foundation, Lexington, Ky.**

**Continuation-in-part of Ser. No. 422,651, Oct. 17, 1989. This application Mar. 9, 1990, Ser. No. 491,452**
**Int. Cl.[5] A61K *31/415***
**U.S. Cl. 514—400** **16 Claims**

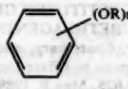
1. A method for in vivo treatment or prevention of gastric ulceration from ingestion of non-steroidal anti-inflammatories comprising:

administering to a patient in need of such treatment α-phenyl t-butyl nitrone and derivatives thereof having spin-trapping activity and preventing ATP depletion in vivo in tissue having the formula;

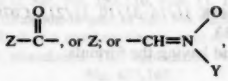


wherein:

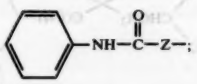
X is phenyl or



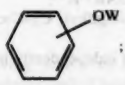
wherein R is H,



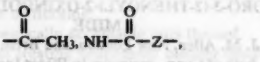
and n is a whole integer from 1 to 5; or

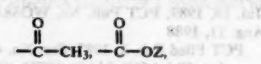


Y is a tert-butyl group that can be hydroxylated or acetylated on one or more positions; phenyl; or



wherein W is





or Z; and

Z is a $C_1$ to $C_5$ straight or branched alkyl group; and

a pharmaceutically acceptable carrier for oral administration to a patient, in a dosage effective to treat or prevent gastric ulceration from ingestion of nonsteroidal antiinflammatory compounds.

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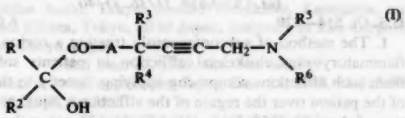
## 5,036,098
## BUTYNYLAMINE DERIVATIVES AND THEIR PRODUCTION

**Kiyoshi Kimura, Takatsuki; Masahiro Kise, and Iwao Morita, both of Kyoto, all of Japan, assignors to Nippon Shinyaku Co., Ltd., Japan**

**Filed Sep. 14, 1989, Ser. No. 407,228**
**Claims priority, application Japan, Sep. 14, 1988, 63-231272**
**Int. Cl.[5] C07C *69/732*; C07D *333/22*; A61K *31/215, 31/38***
**U.S. Cl. 514—438** **21 Claims**

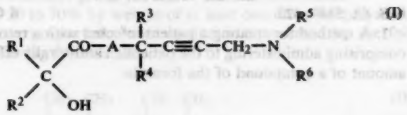
1. A compound of the formula (I):



(I)

or a pharmaceutically acceptable acid addition salt thereof, wherein $R^1$ and $R^2$ are the same or different and each is cycloalkyl of 5 to 7 carbon atoms, phenyl or 2-thienyl; $R^3$ and $R^4$ are the same or different and each is hydrogen or straight or branch chain lower alkyl, or $R^3$ an $R^4$ together with the carbon atom to which they are attached are cycloakyl of 5 to 6 carbon atoms; $R^5$ and $R^6$ are the same or different and each is hydrogen or straight or branch chain lower alkyl and A is O; provided that when either $R^1$ and $R^2$ is phenyl, $R^3$ and $R^4$ are not both hydrogen.

11. A method of treating pollakiuria and incontinence in humans and animals which comprises administering to a human or animal in need thereof a therapeutically effective amount of a compound of the formula (I):



(I)

or a pharmaceutically acceptable acid addition salt thereof, wherein $R^1$ and $R^2$ are the same or different and each is cycloakyl of 5 to 7 carbon atoms, phenyl or 2-thienyl; $R^3$ and $R^4$ are the same or different and each is hydrogen or straight or branch chain lower alkyl, or $R^3$ or $R^4$ together with the carbon atom to which they are attached are cycloakyl of 5 to 6 carbon atoms; $R^5$ and $R^6$ are the same or different and each is hydrogen or straight or branch chain lower alkyl and A is O; provided that when either $R^1$ or $R^2$ is phenyl, $R^3$ and $R^4$ are not both hydrogen in combination with a pharmaceutically acceptable carrier.

5,036,099

## ANHYDROUS, CRYSTALLINE SODIUM SALT OF 5-CHLORO-3-(2-THENOYL)-2-OXINDOLE-1-CARBOXAMIDE

Douglas J. M. Allen, New London, and Brian T. O'Neill, Westbrook, both of Conn., assignors to Pfizer Inc., New York, N.Y.

PCT No. PCT/US87/00201, § 371 Date Jul. 18, 1989, § 102(e) Date Jul. 18, 1989, PCT Pub. No. WO88/05656, PCT Pub. Date Aug. 11, 1988

PCT Filed Feb. 2, 1987, Ser. No. 460,137

Int. Cl.[5] A61K *31/40*; C07D *409/06*

U.S. Cl. 514—414 3 Claims

1. Anhydrous, crystalline sodium salt of 5-chloro-3-(2-thenoyl)-2-oxindole-1-carboxamide.

3. A method of orally treating pain or inflammatory conditions in man which comprises administering an analgesic or antiinflammatory effective amount of the salt of claim 1.

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5,036,100

## PHARMACEUTICAL METHOD AND PREPARATION CONTAINING INDOMETHACIN

Arthur M. Deboeck, Gurabo, P.R.; Philippe R. Baudier, Waterloo, Belgium; Jacques J. Fossion, Braine-L'Alleud, Belgium, and Paul J. Maes, Vise, Belgium, assignors to Pharlyse S.A. Societe Anonyme, Luxembourg, Belgium

Continuation of Ser. No. 166,937, Mar. 11, 1988, abandoned. This application Oct. 5, 1989, Ser. No. 418,756

Claims priority, application Belgium, Mar. 13, 1987, 08700257

Int. Cl.[5] A61K *31/36, 31/40*

U.S. Cl. 514—420 6 Claims

1. The method of subcontaneously treating a region of inflammatory musculoskeletal affliction in patients suffering from such afflictions comprising applying directly to the skin of the patient over the region of the affliction a liquid preparation of about 5 to 15% by weight of indomethacin as the active ingredient of said preparation and, as excipient of said preparation a mixture of 1 to 3% by weight of dimethylisosorbide and 55 to 98.5% by weight of isopropanol, and allowing the preparation to pass through the skin and to the region of said affliction.

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5,036,101

## METHOD FOR TREATING RETROVIRAL INFECTIONS WITH ARYL-(2-PYRRYL) KETONE COMPOUND

Ming-Chu Hsu, New York, N.Y., and Steve Y. Tam, West Caldwell, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

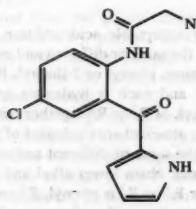
Filed Oct. 30, 1989, Ser. No. 428,559

Int. Cl.[5] A61K *31/40*

U.S. Cl. 514—423 6 Claims

1. A method for treating a patient infected with a retrovirus comprising administering to the patient an anti-virally effective amount of a compound of the formula:

II



or the pharmaceutically acceptable salts.

5,036,102

## METHOD OF TREATING AUTOIMMUNE DISEASES COMPRISING ADMINISTRATION OF PSORALEN DOSAGE FORMS

Maria O. Bachynsky, Nutley; Martin H. Infeld, Upper Montclair; Richard J. Margolis, and Dennis A. Perla, both of Wayne, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 336,179, Apr. 11, 1989, Pat. No. 4,999,375. This application Sep. 14, 1990, Ser. No. 582,467

Int. Cl.[5] A61K *31/35*

U.S. Cl. 514—455 4 Claims

1. A method for the therapy of leukocyte mediated diseases comprising extracorporeal administration to the blood of a subject undergoing ultraviolet-A photophoresis prior to reinfusion of the blood into said subject a composition comprising a sterile aqueous solution of about 0.005 mg/ml to about 1 mg/ml of a psoralen, ethyl alcohol, propylene glycol and water, said composition having a pH from about 2.0 to about 5.5.

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5,036,103

## METHOD OF TREATING CANCER CELLS IN HUMANS

Matsuyuki Kochi, 19, Matsudo Shinden, Matsudo-shi, Chiba-ken, Japan

Continuation of Ser. No. 351,284, May 8, 1989, abandoned, which is a continuation of Ser. No. 214,811, Jul. 5, 1988, abandoned, which is a continuation of Ser. No. 883,666, Jul. 9, 1986, abandoned, which is a continuation-in-part of Ser. No. 683,477, Dec. 19, 1984, abandoned. This application Jul. 25, 1990, Ser. No. 560,221

Claims priority, application Japan, Dec. 27, 1983, 58-244787

Int. Cl.[5] A61K *31/375*

U.S. Cl. 514—467 8 Claims

1. A method of inhibiting a carcinoma or tumor grown in the pancreas, lymph glands, salivary glands or lung, which comprises orally or parenterally administering a carcinoma-inhibiting effective amount of a sodium salt of 5,6-O-benzylidene-L-ascorbic acid to the carcinoma-bearing patient.

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5,036,104

## CYCLOALKYL-SUBSTITUTED GLUTARAMIDE DIURETIC AGENTS

John C. Danilewicz, Nr. Canterbury, and Keith James, Deal, both of England, assignors to Pfizer Inc., New York, N.Y.

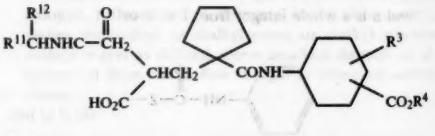
Division of Ser. No. 349,025, May 8, 1989, Pat. No. 4,960,792. This application Jun. 14, 1990, Ser. No. 538,357

Claims priority, application United Kingdom, May 27, 1988, 8812597

Int. Cl.[5] A61K *31/16, 31/19, 31/215*; C07C *271/06*

U.S. Cl. 514—513 10 Claims

1. A compound having the formula:



wherein

$R^3$ and $R^4$ are each independently hydrogen or $C_1$–$C_6$alkyl;

$R^{11}$ is hydrogen, benzyl, $C_1$–$C_6$alkyl, or $C_1$–$C_6$alkyl substituted by amino or benzyloxycarbonylamino;

$R^{12}$ is $COOR^9$ or $CONR^{13}R^{14}$;

$R^9$ is hydrogen, $C_1$–$C_6$alkyl, $C_3$–$C_7$cycloalkyl, phenyl or benzyl; and

$R^{13}$ and $R^{14}$ are each independently hydrogen, $C_1$–$C_6$alkyl, phenyl, or benzyl;

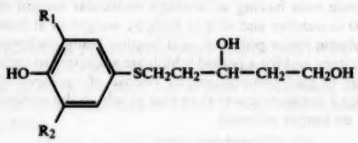
or a pharmaceutically acceptable salt thereof.

## 5,036,105
## 5-LIPOXYGENASE INHIBITORS

Leland J. Chinn, Montebello, Calif.; Bipinchandra N. Desai, Vernon Hills, and Richard A. Mueller, Glencoe, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Division of Ser. No. 47,237, May 5, 1987, Pat. No. 4,801,611. This application Oct. 14, 1988, Ser. No. 257,660
Int. Cl.[5] A61K *31/235*
U.S. Cl. 514—532 2 Claims

1. A method for treating lipoxygenase mediated conditions in mammals comprising administering to a mammal in need of such treatment a therapeutically effective amount of a compound of the formula



wherein $R_1$ and $R_2$ are the same or different members of the group consisting of tert-alkyl of 4 to 10 carbon atoms, or a pharmaceutically acceptable salt thereof.

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## 5,036,106
## METHODS FOR THE TREATMENT OF DISORDERS OF THE CARDIAC VASCULAR SYSTEM

Marvin B. Bacaner, 4401 Fremont Ave. South, Minneapolis, Minn. 55419

Filed Sep. 5, 1989, Ser. No. 403,128
Int. Cl.[5] A61K *31/13, 31/14, 31/135*
U.S. Cl. 514—643 5 Claims

1. A method for suppressing cardiac ventricular arrhythmias in living beings which comprises administering bretylium tosylate to said beings in a small but effective amount at least sufficient to restore sinus rhythm along with small but effective synergistic interacting amount of a tricyclic compound selected from the group consisting of protriptyline, amitriptyline, nortriptyline, desipramine and mazindol.

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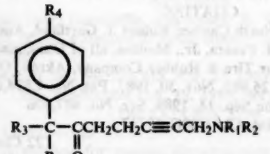
## 5,036,107
## 1,7-SUBSTITUTED HEPTYN-2-ONES AND USE

Waclaw J. Rzeszotarski, Millersville; Maria E. Guzewska; Daniel W. McPherson, both of Baltimore; Ciro J. Spagnuolo, Cockeysville, and Kenneth J. Natalie, Jr., Baltimore, all of Md., assignors to Marion Merrell Dow Inc., Kansas City, Mo.

Continuation of Ser. No. 155,110, Feb. 11, 1988, abandoned, which is a continuation-in-part of Ser. No. 42,959, Apr. 27, 1987, abandoned, which is a continuation-in-part of Ser. No. 879,397, Jun. 27, 1986, abandoned. This application Nov. 16, 1989, Ser. No. 437,165
Int. Cl.[5] A61K *31/135;* C07C *225/18*
U.S. Cl. 514—648 11 Claims

1. A compound of the formula:



wherein

R is cycloalkyl having three to six carbon atoms, methylcyclopropyl, or polycycloalkyl having seven to eleven carbon atoms;

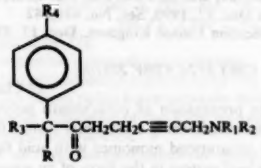
$R_1$ and $R_2$ are methyl;

$R_3$ is hydroxy; and

$R_4$ is hydrogen or fluorine;

and the pharmaceutically acceptable salts thereof.

8. A method of treating neurogenic bladder disorder comprising administering to a patient suffering from said disorder a pharmaceutically effective amount of a compound having the formula:



wherein

R is cycloalkyl having three to six carbon atoms, methylcyclopropyl or polycycloalkyl of seven to eleven carbon atoms;

$R_1$ and $R_2$ are methyl;

$R_3$ is hydroxy; and

$R_4$ is hydrogen or fluorine;

and the pharmaceutically acceptable salts thereof.

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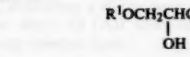
## 5,036,108
## WATER-IN-OIL EMULSION COSMETIC

Masahiko Asahi, Tokyo; Noriko Shirakawa, Kanagawa, and Yuko Kikuta, Tokyo, all of Japan, assignors to Kao Corporation, Tokyo, Japan

Filed Dec. 13, 1989, Ser. No. 450,149
Claims priority, application Japan, Dec. 14, 1988, 63-315694; Feb. 15, 1989, 1-35515
Int. Cl.[5] A61K *7/021, 7/48, 9/08, 9/10*
U.S. Cl. 514—937 10 Claims

1. A water-in-oil emulsion cosmetic which comprises an oily base containing a silicone oil, water and an emulsifier and has a viscosity of 20,000 cps or below at 25° C., wherein said oily base contains the silicone oil in an amount of 50% by weight or more, and said emulsifier is an emulsifier mixture comprising the following components (1) to (4):

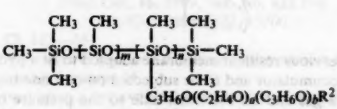
(1) 15 to 35% by weight of at least one α-monoglyceryl ether represented by the following formula (I):



(I)

wherein $R^1$ represents a straight-chain or branched alkyl or alkenyl group having 10 to 24 carbon atoms;

(2) 20 to 70% by weight of at least one dimethyl polysiloxane/polyoxyalkylene copolymer represented by the following formula (II):



(II)

wherein $R^2$ represents a hydrogen atom or an alkyl group having 1 to 5 carbon atoms; m is an integer of from 1 to 150; n is an integer of from 1 to 50; and a and b, which may be the same or different, are each 0 or an integer of from 1 to 35;

(3) 1 to 20% by weight of a polyvalent metal salt of a saturated or unsaturated fatty acid having 10 to 22 carbon atoms; and

(4) 5 to 50% by weight of an inorganic salt having a solubility in water at 20° C. of 0.2 g/100 g of water or more.

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**5,036,109**

## POLYMERIC PARTICLES AND THEIR PREPARATION

**Gerald K. Chip, Scarborough, and Alfred Rudin, Waterloo, both of Canada, assignors to Tioxide Group Plc, London, England**

**Division of Ser. No. 280,969, Dec. 7, 1988, Pat. No. 4,985,469.**
**This application Dec. 17, 1990, Ser. No. 616,842**
**Claims priority, application United Kingdom, Dec. 17, 1987, 8729399**
**Int. Cl.[5] C08J *9/28*; C08F *265/04***
**U.S. Cl. 521—57** **12 Claims**

1. A process for the preparation of core/sheath polymer particles which comprises establishing a monomer system of at least one ethylenically unsaturated monomer with acid functionality, polymerizing said system in the form of an aqueous emulsion to form core particles, establishing an aqueous dispersion of said core particles and a mixture of a nonionic monoethylenically substituted aliphatic monomer, said nonionic monomer being free of functional acid groups and containing at least 2 weight per cent of an ester-containing unsaturated monomer selected from those monomers which on homopolymerization produce a polymer having a glass transition temperature not higher than 15° C. and from 0 to 25 mole per cent of a nonionic monoethylenically unsaturated aromatic monomer and effecting co-polymerisation of the monomers to deposit on said core particles a hard sheath free of acid groups and having a glass transition temperature of at least 40° C. and mixing said core/-sheath particles so formed with a non-volatile fixed or permanent base in the absence of organic solvent to swell said cores at an elevated temperature to generate therein one or more voids.

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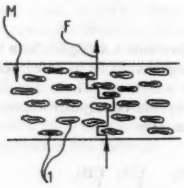
**5,036,110**

## IMPERVIOUS RESILIENT MEMBRANE AND HYDROPNEUMATIC ACCUMULATOR FITTED WITH THAT MEMBRANE

**Philippe Moureaux, Chartre de Bretagne, France, assignor to Automobiles Peugeot, Paris and Automobiles Citroen, Neuilly Sur Seine, both of, France**

**Filed Aug. 29, 1989, Ser. No. 399,959**
**Claims priority, application France, Sep. 20, 1988, 88 12274**
**Int. Cl.[5] B32B *3/02***
**U.S. Cl. 121—137** **12 Claims**




1. An impervious resilient membrane adapted to fit a hydropneumatic accumulator and to be subjected on one side to the pressure of a gas and on the other side to the pressure of a liquid, said membrane comprising a first material and a second material in association, wherein said first material gives said membrane the required elasticity and is selected from the group consisting of thermoplastic polyurethanes, block amide polyethers, flexible polyesters and mixtures thereof, and wherein said second material is enclosed by said first material to provide imperviousness to said gas and is selected from the group consisting of copolymers of ethylene and vinyl alcohol, polyamides, polyvinylidene chloride and mixtures thereof.

**5,036,111**

## EXPANDED MATERIALS WITH NADIMIDE RESIN BASE

**Michel Senneron, Meylan; Gilbert Parrain, Diemoze; Guy Rabilloud, Grenoble, and Bernard Sillion, Lyons, all of France, assignors to Centre D'Etude des Materiaux Organiques Pour Technologies Avancees, Vernaison, France**

**Filed Oct. 17, 1990, Ser. No. 597,666**
**Claims priority, application France, Oct. 17, 1989, 89 13657**
**Int. Cl.[5] C08J *9/02***
**U.S. Cl. 521—182** **20 Claims**

1. Expanded material characterized in that it is obtained by heating a composition comprising 50 to 100% by weight of at least one thermosetting oligomer resin, with nadimide or methyl-nadimide ends having an average molecular weight of 600 to 10,000 in number and of 0 to 50% by weight of at least one thermoplastic linear polymer, said heating being performed at a temperature and for a period which are sufficient to cause the expansion of said composition by release of cyclopentadiene and under a pressure lower than that in which the cyclopentadiene is no longer released.

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**5,036,112**

## CROSS-LINKABLE VINYL ETHER POLYACETAL OLIGOMERS

**James A. Dougherty, Peguannock, N.J.; Jeffrey S. Plotkin, Monsey, N.Y.; Fulvio J. Vara, Chester, and Kolazi S. Narayanan, Palisades Park, both of N.J., assignors to GAF Chemicals Corporation, Wayne, N.J.**

**Filed Jan. 26, 1990, Ser. No. 470,488**
**Int. Cl.[5] C08F *2/46*; C08J *3/28***
**U.S. Cl. 522—31** **19 Claims**

1. A radiation curable composition comprising:

(a) a non-volatile, polymerizable compound of the group of vinyl ether, epoxide, acrylate, vinyloxy alkyl urethane and an oligomer of said compound;

(b) an effective initiating amount of a photoinitiator containing at least 25% of a cationic photoinitiator and

(c) a divinyl ether polyacetal oligomer having the formula

$$CH_2{=}CH(O)R{-}[(O)\underset{\displaystyle CH_3}{\underset{|}{CH}}{-}(X)R'(X){-}\underset{\displaystyle CH_3}{\underset{|}{CH}}(O)R]_n(O)CH{=}CH_2$$

wherein

n has a value of from 1 to 50;

X is uniformly sulfur or oxygen;

R is $C_2$ to $C_4$ alkeneoxy alkylene, poly(alkyleneoxy) alkylene, or a branched, linear or cyclic $C_2$ to $C_{20}$ alkylene and

R′ is phenylene, diphenylene, diphenylene propane, xylylene, tolylene, or a branched, linear or cyclic $C_2$ to $C_{20}$ alkylene optionally substituted with an ester, carbonate, carbamate, or a mono- or poly- $C_2$ to $C_4$ alkyleneoxy radical.

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**5,036,113**

## TIRE HAVING RADIATION CURED AIR BARRIER COATING

**Wyndham H. Boon, North Canton; Robert J. Gartland, Austintown, and Patrick J. Pesata, Jr., Medina, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Division of Ser. No. 126,989, Nov. 30, 1987, Pat. No. 4,874,670.**
**This application Sep. 14, 1989, Ser. No. 407,806**
**Int. Cl.[5] C08G *18/32***
**U.S. Cl. 522—96** **22 Claims**

1. An end capped prepolymer having a molecular weight in the range of about 2,500 to about 10,000, said prepolymer being a reaction product of (1) a polyester diol having a molecular weight in the range of about 700 to about 1500, and a functionality not in excess of about 2.2 and formed by reaction of an alkanediol containing from 2 to about 6 carbon atoms or mix-

ture thereof with an aliphatic dicarboxylic acid containing from 2 to about 10 carbon atoms or mixture thereof; (2) an organic diisocyanate or mixture thereof and (3) an addition polymerizable end group compound having one carbon-to-carbon double bond and one hydroxyl group per molecule, wherein the mole ration of —NCO groups in said diisocyanate to —OH groups in said diol is from about 1.12 to about 1.4, and wherein said end capped prepolymer is prepared by first reacting said polyester diol with said diisocyanate to form a diisocyanate terminated polyester urethane prepolymer comprising alternating units of said polyester diol and said diisocyanate and containing from about 2.5 to about 8 polyester diol units per mole, and then reacting said diisocyanate terminated prepolymer with said end group compound.

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5,036,114

## ACRYLAMIDE POLYSILOXANE COMPOSITION WITH IMPROVED HEAT STABILITY

**Michael A. Lutz, Midland, and Kristen A. Scheibert, Sanford, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.**

**Filed Apr. 10, 1989, Ser. No. 335,639**
**Int. Cl.[5] C08G** *77/04, 77/06*
**U.S. Cl. 522—20** **38 Claims**

1. A composition comprising a polydiorganosiloxane having on the average more than about 0.4 acrylamide functional groups per molecule and being crosslinkable by exposure to ultraviolet radiation in the presence of a photosensitization system, an effective amount of a heat stability additive selected from the group consisting of zinc naphthenate, stannous octoate, and tetraorganotitanate, and an effective amount of a photosensitization system.

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5,036,115

## OPTICAL LENS SYSTEM INCORPORATING MELANIN AS AN ABSORBING PIGMENT FOR PROTECTION AGAINST ELECTROMAGNETIC RADIATION

**James M. Gallas, San Antonio, Tex., assignor to Photoprotective Technologies, Inc., San Antonio, Tex.**

**Continuation of Ser. No. 88,029, Aug. 18, 1987, abandoned, which is a continuation of Ser. No. 837,852, Mar. 6, 1986, abandoned, which is a continuation of Ser. No. 739,756, May 30, 1985, abandoned, which is a continuation of Ser. No. 618,745, Jun. 8, 1984, abandoned. This application Mar. 19, 1990, Ser. No. 497,743**
**The portion of the term of this patent subsequent to Oct. 6, 2004, has been disclaimed.**
**Int. Cl.[5] C08J** *3/00*
**U.S. Cl. 523—106** **19 Claims**

1. A filter for protecting the eyes and skin from radiation emitted by artificial and natural light sources, comprising:

a substrate; and

melanin as absorbing pigment for absorbing ultraviolet, visible and infrared radiation, the substrate and the melanin being transparent.

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5,036,116

## ESTER HARDENERS FOR PHENOLIC RESIN BINDER SYSTEMS

**S. Raja Iyer, Naperville, and Sudhir K. Trikha, Streamwood, both of Ill., assignors to Acme Resin Corporation, Westchester, Ill.**

**Division of Ser. No. 344,215, Apr. 27, 1989, Pat. No. 4,988,745. This application Oct. 18, 1990, Ser. No. 609,669**
**Int. Cl.[5] C08K** *3/36*
**U.S. Cl. 523—145** **8 Claims**

1. A method for making foundry cores and molds which comprises mixing granular refractory material with an aqueous alkaline solution of a phenolic resole resin and a hardener comprising placing the mixture in a core box or pattern mold, and allowing the resin to cure, wherein the hardener composition comprises a solution of a benzylic ether resole resin in an ester, said benzylic ether resole resin comprising from about 5 percent to about 40 percent by weight of the solution.

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5,036,117

## HEAT-CURABLE SILICONE COMPOSITIONS HAVING IMPROVED BATH LIFE

**Kyuha Chung; Antony P. Wright, and Ming-Hsiung Yeh, all of Midland County, Mich., assignors to Dow Corning Corporation, Midland, Mich.**

**Filed Nov. 3, 1989, Ser. No. 431,352**
**Int. Cl.[5] C08F** *2/46*
**U.S. Cl. 522—172** **15 Claims**

1. A curable composition comprising

(A) an organosilicon compound having an average of at least two curing radicals per molecule thereof selected from the group consisting of the hydroxy radical and olefinic hydrocarbon radicals,

(B) an organohydrogensilicon compound containing an average of at least two silicon-bonded hydrogen atoms per molecule thereof, the amounts of Components (A) and (B) being sufficient to provide a ratio of the number of silicon-bonded hydrogen atoms to the number of silicon-bonded curing radicals of from 1/100 to 100/1,

(C) a platinum group metal-containing catalyst in sufficient amount to accelerate a curing reaction among said silicon-bonded curing radicals and said silicon-bonded hydrogen atoms,

(D) an inhibitor compound for said accelerated curing reaction in a total amount sufficient to retard the curing reaction at room temperature but insufficient to prevent said reaction at elevated temperature, and

(E) a bath life extender compound in a total amount sufficient to further retard the curing reaction at room temperature.

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5,036,118

## REINFORCED POLYMER COMPOSITIONS HAVING IMPROVED DISTINCTNESS OF IMAGE

**Eloy C. Martinez, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.**

**Continuation-in-part of Ser. No. 259,214, Oct. 17, 1988, abandoned. This application May 23, 1990, Ser. No. 528,011**
**Int. Cl.[5] C08K** *7/10, 9/06, 13/04;* **C08L** *75/02, 75/08*
**U.S. Cl. 523—212** **25 Claims**

1. A filled polymer composition comprising a polyurethane and/or polyurea matrix having dispersed therein a mica filler having a thickness of less than about 1.5 micrometers and an aspect ratio of greater than about 40, the surface of the composition exhibiting a distinctness of image when painted that is within about 10 DOI units of the distinctness of image of similarly painted steel.

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5,036,119

## PROCESS FOR PREPARING BITUMINOUS COMPOSITION

**Mark A. Berggren, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.**

**Filed Oct. 16, 1989, Ser. No. 422,194**
**Int. Cl.[5] C08J** *3/22, 95/00*
**U.S. Cl. 523—351** **20 Claims**

1. A process to produce a bitumen composition, the process comprising the steps of:

a) providing a carbon black composition comprising carbon black with less than 10% by weight of the carbon black composition being bitumen and carbon black particles being of a particle size of from 5 to 500 nanometers;

b) blending the carbon black composition with 2 or more parts by weight of a block copolymer and less than 10% by weight bitumen, based on the total amount of block copolymer composition, the block copolymer selected from the group consisting of hydrogenated and unhydrogenated block copolymers, the block copolymer, be-

fore hydrogenation, comprising at least two blocks A, the blocks A comprising predominantly polymerized vinyl arene monomer units, and at least one block B, the block B comprising predominantly polymerized conjugated diolefin monomer units wherein the weight ratio of block copolymer to carbon black is in the range of from about 0.01 to about 500; and

c) combining the carbon black composition block copolymer blend with an amount of bitumen which results in 100 parts by weight of bitumen plus block copolymer to form a polymeric bitumen composition.

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**5,036,120**

## THERMOPLASTIC RESIN COMPOSITION AND METHOD FOR PREPARING THE SAME

**Yuichi Orikasa, Yokohama, and Suehiro Sakazume, Fujisawa, both of Japan, assignors to Nippon Petrochemicals Co., Ltd. and Nippon Oil and Fats Co., Ltd., Japan**

**Filed Apr. 3, 1989, Ser. No. 332,885**

**Claims priority, application Japan, Apr. 6, 1988, 63-84397; Apr. 22, 1988, 63-99651**

**Int. Cl.[5] C08L** *59/02, 69/00*

**U.S. Cl. 523—436** **20 Claims**

13. A method for preparing a thermoplastic resin composition which comprises the step of melting and mixing a polyoxymethylene resin alone or a mixture of said polyoxymethylene resin and a polycarbonate polymer (I) with

1 to 100% by weight of a graft polymerization precursor (A) which is obtained by first adding at least one kind of vinyl monomer, at least one kind of radical polymerizable or copolymerizable organic peroxide and a radical polymerization initiator to an aqueous suspension of an epoxy group-containing olefin copolymer, then heating said suspension under such conditions that the decomposition of said radical polymerization initiator does not occur substantially, in order to impregnate said epoxy group-containing olefin copolymer with said vinyl monomer, radical polymerizable or copolymerizable organic peroxide and radical polymerization initiator, and raising the temperature of said aqueous suspension, when the degree of the impregnation has reached 50% by weight or more of the original total weight of said vinyl monomer, peroxide and initiator, in order to copolymerize said vinyl monomer with said radical polymerizable or copolymerizable organic peroxide in said epoxy group-containing olefin copolymer,

0 to 99% by weight of an epoxy group-containing olefin copolymer (B), and

0 to 99% by weight of a vinyl polymer or copolymer (C) obtained by polymerizing at least one kind of vinyl monomer,

or alternatively melting and mixing the components (A), (B) and (C) previously at a temperature in the range of 100° to 300° C. in order to form a multi-phase structure thermoplastic resin (II), and then melting and mixing said resin (II) with said resin (I).

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**5,036,121**

## FLAME AND SMOKE RETARDANT CABLE INSULATION AND JACKETING COMPOSITIONS

**A. William M. Coaker, North Olmsted, and Josef C. Vyvoda, Avon Lake, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio**

**Filed Sep. 6, 1988, Ser. No. 241,163**

**Int. Cl.[5] C08K** *5/34, 5/12*

**U.S. Cl. 524—100** **22 Claims**

1. A low smoke and flame retardant cable comprising at least one insulated conductor said conductor being enclosed in a protective jacket and said jacket comprising: (a) 110 to 140 phr by weight of a flexibilized base polymer, said flexibilized base polymer comprising polyvinyl chloride polymerized in the presence of a flexibilizing agent selected from the group consisting of chlorinated polyethylene, copolymers of ethylene/vinyl acetate, terpolymers of ethylene/vinyl acetate/carbon monoxide and mixtures thereof, and said flexibilizing agent being soluble in vinyl chloride monomer; (b) optionally 5 to 100 phr by weight of additional flexibilizing agent; (c) 2 to 15 phr by weight of at least one lead salt stabilizer; (d) flame and/or smoke suppressing amounts of a flame and/or smoke suppressant compound selected from the group consisting of antimony trioxide, aluminum trihydrate, solid solution of zinc oxide in magnesium oxide, melamine molybdate, copper oxalate, magnesium carbonate, magnesium hydroxide, calcium carbonate, zinc borate, molybdic oxide, alumina ceramic spheres and mixtures thereof; and (e) 20 to 60 phr by weight of a brominated phthalic acid ester plasticizer,

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**5,036,122**

## ADHESIVE COMPOSITIONS

**Robert A. Auerbach, and Doris B. Berry, both of Erie, Pa., assignors to Lord Corporation, Erie, Pa.**

**Continuation of Ser. No. 134,991, Dec. 18, 1987, abandoned. This application Jan. 31, 1990, Ser. No. 504,728**

**Int. Cl.[5] C08K** *5/32*

**U.S. Cl. 524—259** **13 Claims**

1. An aqueous adhesive composition of matter comprising a blend of:

(a) a latex of a polymerized conjugated diene;

(b) a poly-C-nitroso compound; and

(c) a polymaleimide compound which is a polymer of a bismaleimide.

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**5,036,123**

## STRAIGHT OIL COMPOSITION FOR FIBROUS MATERIAL

**Masaru Ozaki, and Isao Ona, both of Chiba, Japan, assignors to Toray Silicon Company, Limited, Tokyo, Japan**

**Filed Oct. 24, 1989, Ser. No. 426,908**

**Claims priority, application Japan, Nov. 4, 1988, 63-278740**

**Int. Cl.[5] C08K** *5/54*

**U.S. Cl. 524—267** **6 Claims**

1. A straight oil composition for fibrous materials comprising:

(A) 100 parts by weight of dimethyl polysiloxane having a viscosity of from 3 to 30 cSt at 25° C. and

(B) 0.5 to 50 parts by weight of a polyoxyalkylene group-containing organopolysiloxane represented by the general formula $Q\{(CH_3)_2SiO\}_xSi(CH_3)_2Q$, wherein x is an integer of one or more and each Q represents, independently, a polyoxyalkylene group having the formula $—RO(C_3H_6O)_a(C_2H_4O)_bR^1$, wherein R represents an alkylene group having from 2 to 5 carbon atoms; $R^1$ represents a radical selected from the group consisting of the hydrogen atom, alkyl groups having from 1 to 6 carbon atoms, $—COCH_3$, and $—COR^2COOH$; $R^2$ represents a divalent hydrocarbon group having from 1 to 15 carbon atoms; $(C_3H_6O)_a$ and $(C_2H_4O)_b$ represent oxyalkylene blocks and these oxyalkylene blocks are connected as shown in the formula Q; a is an integer of 1–15; b is an integer of 1–15; and the a/b ratio is 1/10 to 10/1.

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**5,036,124**

## POLYVINYL CHLORIDE RESIN COMPOSITION FOR POWDER MOLDING

**Toshio Igarashi, Kyoto; Akira Wakatsuki, Ibaraki; Kenichi Sudo, and Yuu Shida, both of Takatsuki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

**Continuation-in-part of Ser. No. 385,412, Jul. 26, 1989, abandoned. This application Aug. 6, 1990, Ser. No. 563,566**

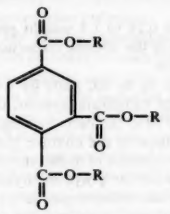
**Claims priority, application Japan, Aug. 3, 1988, 63-194783**

**Int. Cl.[5] C08K** *5/09*

**U.S. Cl. 524—298** **1 Claim**

1. In a polyvinyl chloride resin composition for powder molding comprising a dry blend of a polyvinyl chloride resin and a plasticizer, the improvement wherein said plasticizer is a

mixed trimellitate plasticizer comprising a mixture of compounds represented by general formula I:



(I)

where R stands for an alkyl group, each of said compounds contains the same or different alkyl groups in one and the same molecule, or different molecules, and the alkyl groups in said mixture have a straight chain ratio of at least 85 mol % and consist of 5 to 55 mol % of alkyl groups having at most seven carbon atoms, 45 to 95 mol % of alkyl groups having eight carbon atoms, and at most 10 mol % of alkyl groups having nine and ten carbon atoms, and the content of alkyl groups having eleven or more carbon atoms being less than 1 mol %.

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**5,036,125**

## SINGLE-COMPONENT, STORAGE-STABLE ORGANOPOLYSILOXANES CROSSLINKABLE INTO ELASTOMERIC STATE

**Patrice Perrin, Lyons, France, assignor to Rhone-Poulenc Chimie, Courbevoie, France**

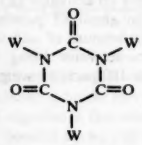
**Filed Jun. 29, 1990, Ser. No. 545,567**
**Claims priority, application France, Jun. 29, 1989, 89 09005**
**Int. Cl.[5] C08K *3/38***
**U.S. Cl. 524—405** **10 Claims**

1. An organopolysiloxane composition stable in storage in the absence of moisture and crosslinkable into elastomeric state in the presence of moisture, which comprises:

(A) 100 parts by weight of at least one $\alpha$, $\omega$-dihydroxydiorganopolysiloxane polymer having a viscosity of 700 to 1,000,000 mPa.s at 25° C., comprising a plurality of diorganosiloxy units of the formula $T_2SiO$, in which the radicals T, which may be identical or different, are hydrocarbon radicals having from 1 to 10 carbon atoms, at least 50% of the number of such radials T being methyl radicals;

(B) 0.5 to 20 parts by weight of at least one ketiminoxysilane crosslinking agent;

(C) at least one isocyanurate of the formula:



in an amount effective to react with all water molecules present in a single-component cold vulcanizable elastomer composition during its packaging in a leakproof package in which the symbols W, which may be identical or different, are monovalent hydrocarbon radicals of the formula:

$$-(CH_2)_n-N=C=O$$

wherein n is an integer ranging from 1 to 12;

(D) 5 to 250 parts by weight of an inorganic filler material; and

(E) 0.0004 to 3 parts by weight of a metal curing catalyst;

with the proviso that said composition is devoid of any compound bearing a primary or secondary amine functional group.

**5,036,126**

## FLAME RETARDANT BLENDS OF POLYCARBONATE, ABS AND A TERPOLYMER

**Michael K. Rinehart, Parkersburg, W. Va., and James J. Ziegelmeyer, Henny, Ill., assignors to General Electric Company, Parkersburg, W. Va.**

**Filed May 30, 1990, Ser. No. 529,369**
**Int. Cl.[5] C08J *5/52*; C08K *5/52*; C08L *5/52***
**U.S. Cl. 524—141** **20 Claims**

1. A polymer blend composition, comprising a polycarbonate polymer, an ABS resin, a phosphate ester flame retardant and a terpolymer formed from an aryl brominated monovinylic aromatic monomer, an ethylenically unsaturated nitrile monomer, and an alkyl methacrylate monomer in which the alkyl group has from 1 to 4 carbon atoms.

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**5,036,127**

## FIBER-REINFORCED THERMOPLASTIC RESIN COMPOSITION

**Kouhei Ueno, and Kazuyoshi Tanaka, both of Osaka, Japan, assignors to UBE Industries, Ltd., Yamaguchi, Japan**

**Filed May 30, 1990, Ser. No. 530,820**
**Claims priority, application Japan, May 30, 1989, 1-134776**
**Int. Cl.[5] C08K *3/30***
**U.S. Cl. 524—423** **10 Claims**

1. A fiber-reinforced thermoplastic resin composition comprising a composition of (a) a thermoplastic resin in an amount of 50 to 99% by weight and (b) fibrous magnesium oxysulfate in an amount of 1 to 50% by weight, and

magnesium oxide in an amount of 0.01 to 30 parts by weight per 100 parts by weight of the fibrous magnesium oxysulfate.

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**5,036,128**

## PRINTED CIRCUIT BOARD

**David Durand, Providence, R.I., assignor to Key-Tech, Inc., Cranston, R.I.**

**Division of Ser. No. 365,712, Jun. 14, 1989, which is a continuation-in-part of Ser. No. 11,975, Feb. 6, 1987, Pat. No. 4,863,757. This application Jan. 30, 1990, Ser. No. 472,192**
**Int. Cl.[5] C08K *3/08***
**U.S. Cl. 524—440** **4 Claims**




1. A U.V. curable ink comprising from about 33 to 38 weight percent of a thermosetting resin binder, 67–62 weight percent of spherical or spheroidal conductive particles having a particle size distribution ranging from 1 to 30 microns and an effective amount of a ketone-amine curing agent.

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**5,036,129**

## FLAME RETARDANT HOT MELT ADHESIVE COMPOSITIONS

**Ray W. Atwell, W. Lafayette; Nicolai A. Favstritsky, Lafayette; John P. Stallings, Lafayette, and Enrico J. Termine, Lafayette, all of Ind., assignors to Great Lakes Chemical Corporation, West Lafayette, Ind.**

**Filed Apr. 17, 1990, Ser. No. 510,087**
**Int. Cl.[5] C08J *91/06*; C08L *91/06***
**U.S. Cl. 524—278** **28 Claims**

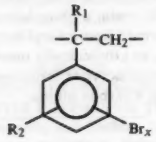
1. A hot melt adhesive composition which comprises:

a tackifying resin;

a wax; and

a flame retardant ethylene vinyl acetate component including a graft copolymer composition having the formula:

wherein n is >1, EVA is ethylene vinyl acetate, and S is a grafted side chain having brominated monomeric units of the formula:



wherein x=1 to 4, $R_1$ is H or $CH_3$, and $R_2$ is H or a $C_{1-4}$ lower alkyl group.

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**5,036,130**

**TRANSPARENT THERMOPLASTIC MOLDING MATERIAL, ITS PREPARATION AND ITS USE**

**Hans-Michael Walter, Freinsheim; Klaus Bronstert, Carlsberg; Hermann Gausepohl, Mutterstadt, and Jüergen Pohrt, Mannheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed May 2, 1989, Ser. No. 347,438**

**Claims priority, application Fed. Rep. of Germany, May 13, 1988, 3816294**

**Int. Cl.[5] C08L** *25/06, 53/02*

**U.S. Cl. 524—505** **4 Claims**

1. A transparent thermoplastic molding material consisting essentially of, based on A+B,

A: from 5 to 95% by weight of polystyrene and

B: from 95 to 5% by weight of a nonelastomeric star block copolymer which is composed of, based on B,

$b_1$: from 60 to 95% by weight of styrene and

$b_2$: from 5 to 40% by weight of one or more conjugated dienes of 4 or 5 carbon atoms

and is prepared in a conventional manner by sequential anionic polymerization using one or more organolithium compounds as an initiator and in the presence of a solvent with subsequent coupling,

wherein component A is produced by conventional anionic polymerization using one or more organolithium compounds in the presence of an organic solvent.

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**5,036,131**

**PROTECTIVE COATING FOR ELECTRICAL COMPONENTS**

**Alan L. Himstedt, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.**

**Filed May 16, 1990, Ser. No. 523,967**

**Int. Cl.[5] C08J** *3/24*

**U.S. Cl. 524—786** **13 Claims**

1. A method of making a thixotropic silicone dispersion consisting essentially of

(A) mixing

(1) 100 parts by weight of a hydroxyl endblocked polydimethylsiloxane having a viscosity of from 5 to 20 Pa.s at 25° C. with

(2) a siloxane of the formula

where R is methyl or phenyl radical, A is phenyl or 3,3,3-trifluoropropyl radical, x is from 3 to 20, y is from 0 to 17, and at least 30 percent of the total organic radicals are A, the amount used being sufficient to give from 0.25 to 2.5 part of siloxane (2) per part of silica (B), then

(B) admixing from 0.24 to 1.5 weight percent, based upon the final weight of the silicone dispersion, of (3) untreated fumed silica, then

(C) admixing from 30 to 200 parts by weight of (4) finely ground aluminum trihydrate powder, then

(D) admixing from 10 to 100 parts by weight of (5) non-reactive solvent to disperse the mixture, then

(E) admixing in the absence of moisture, a moisture activated crosslinking system for polydimethylsiloxane (1) which does not destroy the thioxotropic nature of the dispersion.

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**5,036,132**

**RUBBER BLENDS**

**Aubert Y. Coran, Akron, Ohio, assignor to Monsanto Company, St. Louis, Mo.**

**Division of Ser. No. 814,476, Dec. 30, 1985, abandoned. This application Jun. 29, 1987, Ser. No. 67,024**

**The portion of the term of this patent subsequent to Aug. 18, 2004, has been disclaimed.**

**Int. Cl.[5] C08L** *7/00, 9/00, 23/16;* **C08K** *5/01*

**U.S. Cl. 524—526** **19 Claims**

1. A rubber blend comprising (A) particulate, vulcanized monoolefin copolymer rubber and (B) high diene hydrocarbon rubber wherein the proportions of (A) and (B) are such that the blend is processable and comprises at least about 5% of (A) on the total weight of both rubbers, and the average diameter of the particles of (A) is such that they are substantially all below 50 μm of their weight average is below 10 μm.

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**5,036,133**

**RUBBER COMPOSITIONS CONTAINING A VINYLPYRIDINE-BUTADIENE INTERPOLYMER CO-ACTIVATOR**

**Aubert Y. Coran, Akron, Ohio, assignor to Monsanto Company, St. Louis, Mo.**

**Continuation-in-part of Ser. No. 205,968, Jun. 13, 1988, Pat. No. 4,869,968. This application Oct. 12, 1989, Ser. No. 420,485**

**Int. Cl.[5] C08K** *3/04, 3/36;* **C08L** *7/00, 9/00*

**U.S. Cl. 524—526** **22 Claims**

1. A vulcanizable rubber composition, comprising:

(A) an uncured natural or synthetic isoprene rubber, or one or more uncured butadiene based synthetic rubbers, or uncured blends thereof, said uncured rubbers being sulfur vulcanizable, (B) a silica filler, (C) sulfur, (D) an organic accelerator, and (E) a vinylpyridine-butadiene interpolymer co-activator, said interpolymer co activator (E) containing from about 20 percent to about 65 percent by weight of vinylpyridine units, the amount of said vinylpyridine-butadiene copolymer co-activator being from about 0.5 to 2 parts by weight per 100 parts by weight of said rubber.

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**5,036,134**

**IONOMERIC COATINGS**

**Barbara L. Kunz, Strongsville, and Gary P. Craun, Beren, both of Ohio, assignors to The Glidden Company, Cleveland, Ohio**

**Filed Aug. 23, 1989, Ser. No. 397,280**

**The portion of the term of this patent subsequent to Jul. 23, 2008, has been disclaimed.**

**Int. Cl.[5] C05L** *33/06*

**U.S. Cl. 524—560** **10 Claims**

1. A non-aqueous, protective paint coating composition containing a reactive polymeric binder, the paint coating composition adapted to be applied to a substrate and heat cured to form a hardened paint film adhered to the substrate, the polymer binder comprising on a weight basis:

a carboxyl functional polymer having an Acid No. between 10 and 200 and a number average molecular weight be-

tween about 500 and 100,000, where the carboxyl functional polymer is selected from an acrylic copolymer, a linear polyester polymer, a polyester-acrylic graft copolymer, and a polyurethane polymer;

an organic zinc salt having an acidified counterion with a pKa (dissociation constant in water) above about 4 where the ratio of said organic zinc salt to said carboxyl functional polymer is at a level such that the organic zinc salt neutralizes at least 10% of the equivalents of carboxyl functionality of the carboxyl functional polymer to form at least a partially zinc neutralized ionomer substantially free of ionic clustering between said organic zinc salt and said carboxyl functional polymer; and

said paint coating composition is heat curable upon applying said paint coating to a substrate, and upon heat curing to form a hardened paint film, the organic zinc salt coreacts with said carboxyl functional polymer and the zinc cation clusters with the carboxyl functional polymer to form ionomeric links and a hardened paint film while the organic anion of the organic zinc salt is protonated and volatilizes from the coating composition.

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**5,036,135**

## HEAT CURABLE, REACTION RESIN MIXTURES

**Wolfgang von Gentzkow, Kleinsendelbach; Jürgen Huber, Erlangen; Wolfgang Rogler, Moehrendorf, and Dieter Wilhelm, Forchheim, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed Jul. 19, 1990, Ser. No. 555,252**

**Claims priority, application Fed. Rep. of Germany, Jul. 19, 1989, 3923915**

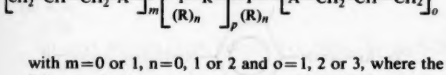
**Int. Cl.[5] C08L *75/04***

**U.S. Cl. 524—786** **20 Claims**

1. A heat curable reaction resin mixture comprising the following constituents:

(A) a phosphorus-free, polyfunctional epoxide;

(B) an epoxy group-containing phosphorus compound of the following structure:



with m=0 or 1, n=0, 1 or 2 and o=1, 2 or 3, where the following holds: m+n+o=3, and with p=0, 1 or 2;

X signifies a free electron pair or an O— or S— atom bonded by way of a double bond;

R signifies an alkyl residue having 1 to 4 C-atoms; an alkenyl residue having 2 to 3 C-atoms; an aryl residue; an arylalkyl residue; a dialkyl-amino residue or alkyl-aryl-amino residue or a 3-trialkylsilyl-propyl residue; R being bonded directly or by way of O or S;

R′ denotes a bridge of O, S, phenylene, dioxyphenylene, dioxynaphthylene, $(CH_2)_r$, O—$(CH_2)_r$, O—$(CH_2)_r$—O or O—$(CH_2)_r$—$(Si(CH_3)_2$—O$)_s$—$Si(CH_3)_2$—$(CH_2)_r$—O with r=1 to 3 and s=1 to 8, or (O—$CH_2$—$CH_2)_r$—O, (O—CH($CH_3$)—$CH_2)_r$—O or (O—$(CH_2)_4)_r$—O with t=2 to 100; and

$A^1$ and $A^2$, which can be equal or different, denote a single bond or a bridge according to the grouping R′;

(C) a polyfunctional isocyanate; and

(D) a curing catalyst.

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**5,036,136**

## MIXTURES OF COLLOIDAL ROD-LIKE VISCOELASTIC FLUIDS AND ANIONIC-ALKYL CONTAINING COPOLYMERS

**Dennis G. Peiffer, East Brunswick, N.J., assignor to Exxon Research and Engineering Company, Florham Park, N.J.**

**Division of Ser. No. 135,830, Dec. 21, 1987, Pat. No. 4,910,248. This application Dec. 26, 1989, Ser. No. 456,716**

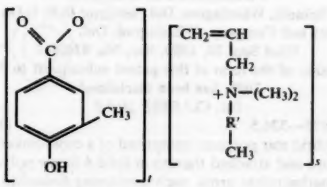
**Int. Cl.[5] C08J *0/00***

**U.S. Cl. 524—812** **5 Claims**

1. A solution comprising

(a) water; and

(b) about 0.01 to about 10 weight % of a water soluble polymerizable material characterized by the formula:



wherein R′ is a 6–22 straight chained or branched chained alkyl or cycloalkyl group and the ratio of t to s is about 1/5 to 5/1.

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**5,036,137**

## SILATED POLYVINYL ALCOHOL PROCESS

**Arjun C. Sau, Newark, Del., assignor to Aqualon Company, Wilmington, Del.**

**Division of Ser. No. 411,812, Sep. 25, 1989, Pat. No. 4,990,563. This application Oct. 1, 1990, Ser. No. 591,234**

**Int. Cl.[5] C08F *8/00***

**U.S. Cl. 525—61** **6 Claims**

1. A method of preparing a water soluble silated polyvinyl alcohol comprising the steps:

(1) preparing a polyvinyl alcohol homopolymer or copolymer with a degree of hydrolysis between 90 and 100%;

(2) reacting the homopolymer or copolymer as a slurry with a silating agent in an alkaline environment at a temperature above 50° C.; and

(3) recovering a silated polyvinyl alcohol homopolymer or copolymer with a degree of silyl substitution between 0.005 and 0.5.

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**5,036,138**

## ELASTOMERIC COMPOSITIONS, PROCESS FOR THE PREPARATION THEREOF AND TIRES CONTAINING THEM

**Jan E. Stamhuis; Antonius A. Broekhuis, and Pieter Luijk, all of CM Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.**

**Filed Oct. 11, 1988, Ser. No. 255,240**

**Claims priority, application United Kingdom, Oct. 19, 1987, 8724437**

**Int. Cl.[5] C08L *9/06, 25/10, 53/02***

**U.S. Cl. 525—99** **8 Claims**

1. An elastomeric composition suitable for use in the tread portion of pneumatic tire, said composition comprising:

(1) from 10 to 90% by weight of a copolymer A of a mono-aromatic vinyl compound and a conjugated diene and having a content of mono-aromatic vinyl compound in the range of from 10 to 40% by weight, a vinyl content in the conjugated diene units of at least 50% by weight, calculated on total conjugated diene units, and a glass transition temperature above minus 35° C., and

(2) from 90 to 10% by weight of a polymer B which is a homopolymer of a conjugated diene or a copolymer of a

mono-aromatic vinyl compound and a conjugated diene, said polymer B containing less than 25% by weight of mono-aromatic vinyl compound and having a vinyl content in the conjugated diene units of less than 25% and a glass transition temperature below minus 55° C.,

said percentages by weight of copolymer A and polymer B being calculated on the total of A and B, and copolymer A and polymer B, if present as a copolymer, having a differential content of the aromatic vinyl compound over the polymer chain which varies less than five percentage points; as determined by monomer conversion.

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**5,036,139**

**HYBRID ACRYLIC STAR POLYMERS WITH POLYSILOXANE CORES**

**Harry J. Spinelli, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Sep. 29, 1989, Ser. No. 414,414**

**The portion of the term of this patent subsequent to Jul. 16, 2008, has been disclaimed.**

**Int. Cl.[5] C08F *30/08***

**U.S. Cl. 525—326.5** **11 Claims**

1. A hybrid star polymer comprised of a cross-linked polysiloxane core and attached thereto at least 4 linear polyacrylate and/or methacrylate arms, each arm being linked to at least one silicon atom comprising the core by means of a chemical bond between a carbon atom contained in an ester group portion of the acrylate and/or methacrylate arm polymer and said one silicon atom of the core, said star polymer having a finite number average molecular weight.

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**5,036,140**

**FILM FROM BLEND OF ETHYLENE POLYMERS, ETHYLENE BUTENE POLYMER AND PROPYLENE POLYMERS**

**Charles C. Hwo, Sugar Land, Tex., assignor to Shell Oil Company, Houston, Tex.**

**Continuation-in-part of Ser. No. 50,648, May 18, 1987, which is a continuation-in-part of Ser. No. 750,342, Jun. 28, 1985, abandoned. This application Feb. 28, 1990, Ser. No. 486,562**

**Int. Cl.[5] C08L *23/20***

**U.S. Cl. 525—222** **8 Claims**

1. A packaging film or sheet which is capable of forming peel seals consisting essentially of a mixture containing:

from 10 percent by weight to 45 percent by weight of an ethylenic homopolymer or copolymer, wherein said ethylenic homopolymer is selected from the group consisting of medium density polyethylene, and high density polyethylene, and said ethylenic copolymer is selected from the group consisting of linear low density polyethylene copolymer, ethylene vinyl acetate copolymer, and ethylene methyl acrylate copolymer;

from 50 percent by weight to 85 percent by weight of a butene-1 copolymer with an ethylene comonomer content of 1–15 mole percent; and

from 3 percent by weight to 15 percent by weight of a non-elastomeric propylene homopolymer or non-elastomeric random copolymer wherein said non-elastomeric propylene homopolymer or non-elastomeric random copolymer contains greater than 50 mole percent propylene.

6. A blend for producing a packaging film which is capable of forming peel seals consisting essentially of a mixture containing:

from 10 percent by weight to 45 percent by weight of an ethylenic homopolymer or copolymer, wherein said ethylenic homopolymer is selected from the group consisting of medium density polyethylene, and high density polyethylene, and said ethylenic copolymer is selected from the group consisting of linear low density polyethylene copolymer, ethylene vinyl acetate copolymer, and ethylene methyl acrylate copolymer and wherein said ethylenic copolymer is a random copolymer;

from 50 percent by weight to 85 percent by weight of a butene-1 copolymer with an ethylene comonomer content of 1–15 mole percent; and

from 3 percent by weight to 15 percent by weight of a non-elastomeric propylene homopolymer or non-elastomeric random copolymer wherein said non-elastomeric propylene homopolymer or non-elastomeric random copolymer contains greater than 50 mole percent propylene.

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**5,036,141**

**MODIFIED POLYOLEFIN RESIN**

**Yoshiki Toyoshima; Mitsuyuki Okada, both of Ichihara; Takeshi Fujii, Chiba; Kentaro Yamaguchi, and Mitsuji Tsuji, both of Ichihara, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

**Continuation of Ser. No. 273,481, Nov. 21, 1988, abandoned. This application Jul. 24, 1990, Ser. No. 556,851**

**Claims priority, application Japan, Nov. 20, 1987, 62-294751**

**Int. Cl.[5] C08F *269/00***

**U.S. Cl. 525—286** **8 Claims**

1. A modified polyolefin resin obtained by melt-kneading a mixture consisting of

(A) 100 parts by weight of a polyolefin resin having a melt flow rate of 0.05–60 g/10 min.,

(B) 0.1–5 parts by weight of at least one compound selected from the group consisting of unsaturated carboxylic acids, the derivatives thereof and unsaturated epoxy compounds,

(C) 0.1–5 parts by weight of an unsaturated aromatic compound and

(D) 0.01–2 parts by weight of a free-radical initiator, the molar ratio of (B)/(C) ranging from 1/0.1 inclusive to 1/1 exclusive.

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**5,036,142**

**PROCESS FOR MAKING ELECTRO-OPTICALLY ACTIVE POLYMERS**

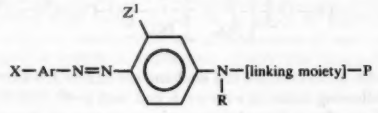
**Chengjiu Wu, Morristown, N.J., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.**

**Filed Dec. 26, 1989, Ser. No. 456,419**

**Int. Cl.[5] C08F *8/34***

**U.S. Cl. 525—348** **7 Claims**

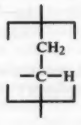
1. The method for making optically active polymers composed of a carbon-carbon backbone chain having the general formula:




wherein X, Ar, $Z^1$, R, [linking moiety], and P have the meanings set forth below, which comprises reacting in homogeneous solution in an aprotic polar solvent a polymer having the general composition [terminal moiety]—[linking moiety]—P wherein

(a) P represents a polymeric carbon-carbon backbone chain having the structure

(I)



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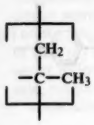
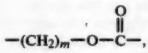
(2)

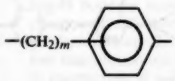


and

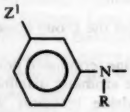
(3) units of (1) or (2), above, copolymerized with
(i) alkyl acrylate wherein the alkyl moiety contains from about 1–5 carbons,
(ii) alkyl methacrylate wherein the alkyl moiety contains from about 1–5 carbons,
(iii) acryl amide,
(iv) methacryl amide, and
(v) styrene;
(b) the linking moiety is
(1) $-(CH_2)_m-$,
(2) $-(CH_2)_m-O-$
(3)



(4) $-(CH_2)_m-O-CH_2-$ or
(5)



wherein m is an integer of from about 1–20; and
(c) the terminal moiety is

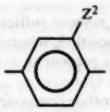


wherein
(1) $Z^1$ is H or OH,
(2) R is
(i) H,
(ii) alkyl, straight chain, branched or cyclic, having 1–20 carbon atoms,
(iii) $-C_nH_{2n}OH$ wherein n is an integer of from about 1–20, or
(iv) an alkylene bridging group having 2 to 4 carbon atoms connecting the N atom to the o- position of the aromatic ring to which the N atom is attached,
with a diazonium salt having the general formula

$$X-Ar-N_2^+A^-$$

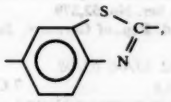
wherein
(a) X is
(1) $-NO_2$,
(2) $-CN$,
(3) $-COOR^3$ wherein $R^3$ is alkyl, straight chain, cyclic or branched having 1–20 carbon atoms,
(4) $-CH=C(CN)_2$, or
(5) $-C(CN)=C(CN)_2$;
(b) Ar is selected from the group consisting of

(1)



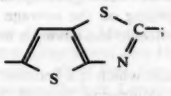
wherein $Z^2$ is
(i) —H,
(ii) —OH, or
(iii) alkyl, straight chain, branched or cyclic, having from about 1–20 carbon atoms,

(2)

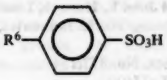


or

(3)



(c) $A^-$ is the conjugate base of an organic strong acid or superacid HA which is:
(1) substituted sulfonic acid $R^5SO_3H$ wherein $R^5$ is
(i) $-CH_3$,
(ii) $-CH_2(CF_2)_nF$ wherein n is an integer of from about 1–10, or
(iii) $-(CF_2)_nF$ wherein n is an integer of from 1–10;
(2) substituted benzenesulfonic acid



wherein $R^6$ is
(i) $-CH_3$,
(ii) —Cl,
(iii) —Br, or
(iv) $-NO_2$;
followed by recovering the desired reaction product from the reaction mixture.

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**5,036,143**

## URETHANE ADHESIVE

**Melvin Brauer, East Brunswick, and Clayton C. Crawford, Bayonne, both of N.J., assignors to CasChem, Inc., Bayonne, N.J.**

**Division of Ser. No. 38,081, Apr. 14, 1987, Pat. No. 4,889,915. This application Dec. 15, 1988, Ser. No. 284,648**
**Int. Cl.[5] C08L 75/14; C08K 5/07**
**U.S. Cl. 524—361** **21 Claims**

1. A composition for forming a urethane adhesive having high green strength comprising:
a polyol;
a thermoplastic polyurethane having a pendant or extra-linear group which contains an aliphatic non-benzenoid

group and which is soluble in methyl ethyl ketone to at least 1 weight percent, said thermoplastic polyurethane

present in an amount sufficient to impart tack and green strength to the adhesive;

an organic isocyanate compound in an amount sufficient to impart curing properties to the composition, wherein one of said polyol and said isocyanate is present in a molar excess compared to the other; and

a solvent which is compatible with the other components in an amount sufficient to form a single phase liquid solution.

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**5,036,144**

## POWDERED LACQUER OF EPOXY RESIN OF DIAMINE-BENZENE POLYCARBOXYLIC ACID SALT

**Joern-Vollker Weiss, Haltern, Fed. Rep. of Germany, assignor to Huels Aktiengesellschaft, Marl, Fed. Rep. of Germany**

**Filed May 21, 1987, Ser. No. 52,379**

**Claims priority, application Fed. Rep. of Germany, Jul. 17, 1986, 3624078**

**Int. Cl.[5] C08L** *63/02, 63/06, 63/08*

**U.S. Cl. 525—423** **7 Claims**

1. A powdered lacquer which is storage stable and which, when applied to a surface and heated at a temperature ranging from 160°–240° C., provides a lacquer coating, comprising:

(a) an epoxy compound comprising on the average more than one epoxy group per molecule and having a melting point above 70° C.;

(b) a salt of a polycarboxylic acid which is a benzene polycarboxylic acid compound containing from 2–5 acid groups and a nitrogen-containing compound which is a primary $C_{4-18}$ aliphatic diamine or a $C_{4-18}$ cycloaliphatic diamine; and

(c) 1,4-diazabicyclo-[2,2,2]-octane; prepared by mixing ingredients (a), (b) and (c) as dry materials.

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**5,036,145**

## ALKOXYSILANE AND ALKOXYSILANE TERMINATED POLYAMIC OR POLYIMIDE LACQUER COMPOSITION

**Garry K. Echterling, Bausman, and John E. Herweh, Lancaster, both of Pa., assignors to Armstrong World Industries, Inc., Lancaster, Pa.**

**Filed Jul. 10, 1989, Ser. No. 377,114**

**Int. Cl.[5] C08L** *77/00*

**U.S. Cl. 525—431** **18 Claims**

1. A lacquer composition comprising an amic acid, an alkoxysilane and a silane coupling agent, said amic acid being the reaction product of an aromatic or aliphatic dianhydride and an aminoalkyltrialkoxysilane or aminoaryltrialkoxysilane, said alkoxysilane being a tetra($C_1$–$C_3$)alkoxysilane, and said silane coupling agent being a glycidoxy($C_2$–$C_4$)alkyltri($C_1$–$C_2$)alkoxysilane.

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**5,036,146**

## HIGH TEMPERATURE RESISTANT POLYSULFONE-POLYIMIDE BLOCK COPOLYCONDENSATES AND PREPARATION THEREOF BY MELT CONDENSATION

**Carola Hedtmann-Rein, Hirschberg, and Gerhard Heinz, Weisenheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Dec. 15, 1989, Ser. No. 451,233**

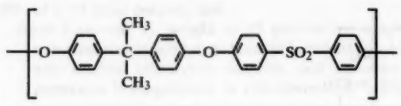
**Claims priority, application Fed. Rep. of Germany, Jan. 12, 1989, 3900675**

**Int. Cl.[5] C08G** *75/23*

**U.S. Cl. 525—436** **8 Claims**

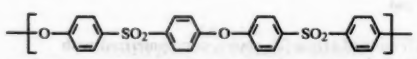
1. A high temperature resistant polysulfone-polyimide block copolycondensate containing, based on the total amount of (A) and (B),

(A) from 70 to 98 mol %, of polyarylene ether sulfone blocks having a number average molecular weight Mn within the range from 1,500 to 20,000 and composed of units of the formulae



(I)

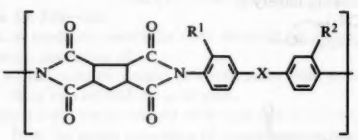
or



(II)

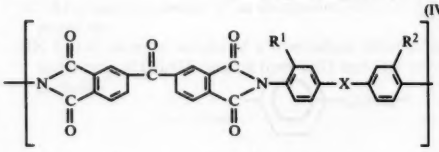
or of mixtures of units of the formulae (I) and (II), bonded in random distribution or in the form of blocks, and

(b) from 2 to 30 mole %, of polyimide blocks having a number average molecular weight Mn of from around 400 to 5,000 and composed of units of the formulae



(III)

or



(IV)

or of mixtures of units of the formulae (III) and (IV), where

$R^1$ and $R^2$ are identical or different and each is hydrogen or methyl and

X is a bridge member selected from the group consisting of $—CH_2—$ and $—CH_2CH_2—$

and prepared by melt condensing amine terminated polyarylene ether sulfone blocks with the aromatic diamine and aromatic tetracarboxylic dianhydride reactants which form the polyimide blocks.

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**5,036,147**

## PROPYLENE POLYMERIZATION METHOD

**Craig C. Meverden, Mason, Ohio, and Thomas J. Pullukat, Hoffman Estates, Ill., assignors to Quantum Chemical Corporation, Cincinnati, Ohio**

**Division of Ser. No. 374,660, Jun. 30, 1989, Pat. No. 4,968,653. This application Sep. 11, 1990, Ser. No. 580,764**

**Int. Cl.[5] C08F** *4/654*

**U.S. Cl. 526—119** **32 Claims**

1. A method of making propylene polymers comprising the step of homopolymerizing propylene or copolymerizing a major amount of propylene with one or more other 1-olefins under polymerization conditions in the presence of a catalyst system comprising, in combination:

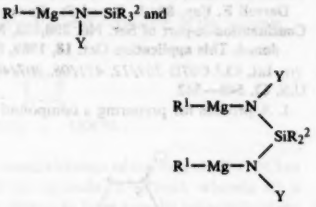
I. a solid catalyst component prepared by the method comprising the steps of:

(a) contacting porous particles of a predominately silica support material having surface hydroxyl groups, surface siloxane groups, or both with a magnesium silylamide compound and thereafter contacting the resulting product with a first electron donor stereoregulating agent; or

(b) contacting porous support material particles as defined

in step (a) with a complex prepared by contacting a magnesium silylamide compound with a first electron donor stereoregulating agent; or,

(c) contacting porous support material particles as defined in step (*a*) with a first electron donor stereoregulating agent followed by a magnesium silylamide compound; said magnesium silylamide compound being of a formula selected from the group consisting of



wherein $R^1$ is a straight or branched chain non-substituted alkyl group having 1 to 12 carbon atoms, $R^2$ is hydrogen or a straight or branched chain alkyl group having 1 to 12 carbon atoms, and Y is an alkyl group, an aryl group, or $-SiR^3_3$, wherein $R^3$ is hydrogen or a straight or branched chain alkyl group having 1 to 12 carbon atoms, all $R^1$ groups are the same or different, all $R^2$ groups are the same or different, all $R^3$ groups are the same or different, all Y groups are the same or different, and each of said $R^2$ and $R^3$ alkyl groups is non-substituted or substituted with one or more inert substituents that are non-reactive to the Mg-N bond or bonds of said magnesium silylamide compound; (2) reacting to completion the contact product of step (1) with a first halogenated tetravalent titanium compound, the atomic ratio of titanium to magnesium in said solid catalyst component being in the range of about 1:2 to about 1:4;

(3) activating the reaction product of step (2) by contact thereof with a molar excess with respect to magnesium in said solid catalyst component of a second halogenated tetravalent titanium compound which may be the same as or different from said first titanium compound in liquid form at an elevated temperature with respect to step (2) to provide an active solid catalyst component; and,

(4) separating and washing said active solid catalyst component: and,

II. a complex of an alkyl aluminum cocatalyst compound and a second electron donor stereoregulating agent which may be the same as or different from said first electron donor stereoregulating agent, the molar ratio of said second electron donor stereoregulating agent to the aluminum of said cocatalyst compound being in the range of about 0.01:1 to less than about 1:1.

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**5,036,148**

## PRODUCTION OF SUBSTANTIALLY LINEAR HIGHLY CRYSTALLINE POLYOLEFINS

**Henri D. Chanzy, Isere, France; Bruno Rotzinger, Untersiggenthal, Switzerland, and Paul Smith, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation of Ser. No. 179,556, Apr. 8, 1988, abandoned, which is a division of Ser. No. 901,768, Aug. 29, 1988, Pat. No. 4,769,433, which is a continuation-in-part of Ser. No. 802,153, Nov. 25, 1985, abandoned, which is a continuation-in-part of Ser. No. 692,410, Jan. 17, 1985, abandoned. This application Oct. 25, 1989, Ser. No. 526,623**

**Int. Cl.[5] C08F *2/02, 4/52***

**U.S. Cl. 526—169.2** **2 Claims**

1. Process for the preparation of substantially linear, highly crystalline polyethylene homopolymer and ethylene/higher olefin copolymer which has a molecular weight of greater than 1,000,000 and which can be compression molded or extruded at a temperature below its melting point, said process comprising contacting ethylene or a mixture of ethylene and not more than 2 mole % of higher olefin, based on the moles of ethylene and higher olefin, and a suitable polymerization catalyst comprising an $Al^{+3}/V^{+3}$ homogeneous catalyst system wherein the concentration of $V^{+3}$ is 0.00002–0.00004 M and the polymerization reaction is −40° C. to 20° C., at a pressure no greater than 15 psig, under polymerizing conditions such that the surface temperature of the formed polymer does not exceed 90° C. and such that the surface of the formed polymer does not substantially dissolve in the polymerization reaction mixture, and thereafter recovering the formed polymer below its melting point without dissolution thereof in a solvent.

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**5,036,149**

## PROCESS FOR THE PREPARATION OF ETHYLENE/ACRYLONITRILE COPOLYMERS, NEW ETHYLENE/ACRYLONITRILE COPOLYMERS AND THEIR USE

**Werner Obrecht, Moers; Szolt Szentivanyi, Tokyo; Hubert Sutter, Leverkusen; Jens Herwig, Cologne, and Alois Kolwert, Roesrath, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Dec. 11, 1989, Ser. No. 448,504**

**Claims priority, application Fed. Rep. of Germany, Dec. 23, 1988, 3843561**

**Int. Cl.[5] C08F *20/10***

**U.S. Cl. 526—323.2** **1 Claim**

1. Ethylene/acrylonitrile copolymers having gel contents of less than 0.2% by weight, based on the copolymer and determined as insoluble residue after 24 hours' extraction with chlorobenzene in a Soxhlet extractor containing from 10 to 90% by weight of acrylonitrile incorporated by polymerisation and from 50 ppm to 2% by weight of copolymerised (meth)acryloyl compounds containing at least two acryloyl or methacryloyl groups per molecule produced by solvent-free polymerisation of the monomers by the high pressure process at pressures from 500 to 5000 bar wherein polymerisation is carried out in the presence of from 50 ppm to 2% by weight, based on the polymerisable monomers put into the process, of (meth)-acryloyl compounds containing at least two acryloyl or methacryloyl groups per molecule.

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**5,036,150**

## POLYARYLATES HAVING IMPROVED HYDROLYTIC STABILITY

**James H. Kawakami; James E. Harris, both of Piscataway; Louis M. Maresca, Belle Mead, and Lloyd M. Robeson, Whitehouse Station, all of N.J., assignors to Amoco Corporation, Chicago, Ill.**

**Continuation of Ser. No. 591,546, Mar. 20, 1984, abandoned. This application Apr. 20, 1990, Ser. No. 512,125**

**Int. Cl.[5] C08G *75/28***

**U.S. Cl. 528—173** **3 Claims**

1. A hydrolytically stable polyarylate consisting of the following repeating units:

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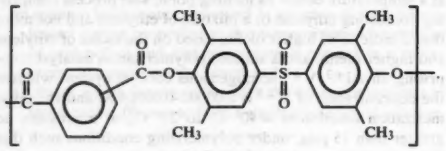


5,036,151

## MOLD RELEASEL AGENTS FOR POLY(ESTER) CARBONATES

Holger Ohst, Bergisch Gladbach; Helmut-Martin Meier, Ratingen, and Klaus Kircher, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Mar. 14, 1990, Ser. No. 493,269

Claims priority, application Fed. Rep. of Germany, Mar. 16, 1989, 3908598

Int. Cl.[5] C08K *5/3492;* C07D *251/32;* C09K *15/32*

U.S. Cl. 524—101 10 Claims

1. A process for the production of a compound containing an isocyanurate group which comprises trimerizing an aliphatic or cycloaliphatic monoisocyanate at a temperature of 50° to 250° C. and a pressure of 0.1 to 100 bar in the presence of 0.1 to 10% by weight, based on the weight of said monoisocyanate, of a triaryl phosphane catalyst and terminating the reaction when the isocyanate content is substantially 0% by weight.

5,036,152

## ALKOXYCARBONYLALKYLPHOSPHOLIPIDS AND ALKYLAMINOCARBONYLALKYLPHOSPHOLIPIDS

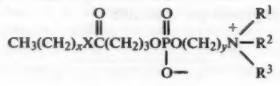
Nicholas J. Hrib, Somerville; Kirk D. Shoger, Piscataway, and John J. Tegeler, Bridgewater, all of N.J., assignors to Hoechst-Roussel Pharmaceuticals Incorporated, Somerville, N.J.

Division of Ser. No. 116,285, Mar. 10, 1988, Pat. No. 4,888,328. This application Sep. 5, 1989, Ser. No. 403,892

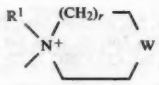
Int. Cl.[5] C07D *295/04, 295/084, 277/04;* C07F *9/09*

U.S. Cl. 544—57 3 Claims

1. A compound of the formula



wherein X is a bivalent radical of the formula —O— or —N(-H)—; $R^1$ is an alkyl radical having up to 6 carbon atoms, inclusive; $R^2$ and $R^3$ taken together with $R^1$ and the nitrogen atom to which they are attached form a group of the formula



wherein r is 0 or 1, W is oxygen, $CH_2$, sulfur or $N(R^4)$ wherein $R^4$ is an alkyl radical having up to 6 carbon atoms, inclusive, or aryl; the term "aryl" in each occurrence signifying a phenyl radical optionally substituted by one or more substituents selected from the group consisting of alkyl, alkoxy, halogen, hydroxy or trifluoromethyl; x is an integer having a value from 0 to 20, inclusive; and y is an integer having a value from 0 to 6, inclusive, and optical antipodes thereof.

3. A method of treating inflammation comprising administering to a patent in need of inflammation alleviation, an inflammation alleviating effective amount of a compound as defined in claim 1.

5,036,153

## PREPARATION OF 2,5-DIAZABICYCLO[2.2.1]HEPTANES AND INTERMEDIATES

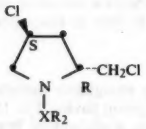
Tamim F. Braish, 991 Shewville Rd., Ledyard, Conn. 06339, and Darrell E. Fox, 89½ S. Broad St., Pawcatuck, Conn. 06379

Continuation-in-part of Ser. No. 350,423, May 11, 1989, abandoned. This application Oct. 18, 1989, Ser. No. 423,063

Int. Cl.[5] C07D *207/12, 471/08, 207/408;* B01J *31/24*

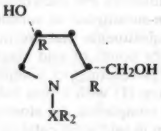
U.S. Cl. 548—542 2 Claims

1. A process for preparing a compound of the formula



IX

wherein X is $SO_2$ or $CO_2$, and $R_2$ is $C_1$–$C_6$ alkyl, trifluoromethyl, benzyl, or phenyl or phenyl substituted by one or two $C_1$–$C_6$ alkyl, halogen, nitro, methoxy, or trifluoromethyl, which comprises heating a compound of the formula



X

wherein X and $R_2$ are as defined above, with tosylchloride in pyridine at a temperature of about 70 ° to about 115° C.

5,036,154

## PREPARATION OF GLYCIDYL ESTERS

Andrew T. Au, Sugarland, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Nov. 15, 1989, Ser. No. 437,483

Int. Cl.[5] C07D *301/12*

U.S. Cl. 549—531 19 Claims

1. A process for preparing glycidyl esters which comprises reacting a compound or mixture of compounds containing one or more ethylenically unsaturated ester groups with hydrogen peroxide in the presence of (a) at least one alkali metal or alkaline earth metal salt of tungstic acid, (b) phosphoric acid and (c) at least one phase transfer catalyst.

5,036,155

## PROCESS FOR ISOPROPYL 3S-AMINO-2R-HYDROXY-ALKANOATES

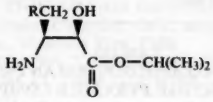
Robert W. Dugger, Mystic, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 374,200, Jun. 29, 1989, Pat. No. 4,965,372, which is a continuation-in-part of Ser. No. 299,863, Jan. 19, 1989, abandoned. This application Jul. 31, 1990, Ser. No. 560,940

Int. Cl.[5] C07C *229/34, 229/22, 229/28*

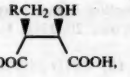
U.S. Cl. 560—39 6 Claims

1. A step-wise process for the preparation of an isopropyl 3S-amino-2R-hydroxyalkanoate of the formula

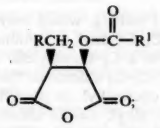

(I)

wherein R is phenyl, isopropyl or cyclohexyl, which comprises the steps of

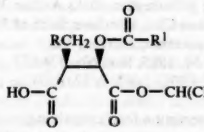
(a) reacting a 2R,3S-malic acid derivative of the formula


(II)

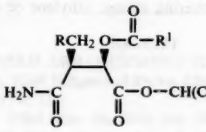
with excess of an acid chloride of the formula $R^1COCl$ or an anhydride of the formula $(R^1CO)_2O$, wherein $R^1$ is $(C_1-C_4)$alkyl or phenyl, to form a cyclic anhydride of the formula


(III)

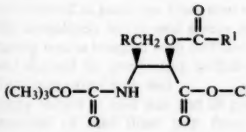
(b) reacting said cyclic anhydride of the formula (III) with excess of isopropanol to form a hemiester of the formula


(IV)

(c) activating the carboxylic acid group of said hemiester of the formula (IV) and reacting the resulting activated form of the acid with $NH_3$ to form an ester-amide of the formula


(VI)

(d) rearranging said ester-amide of the formula (VI) by the action of $Pb(OCOCH_3)_4$ in t-butanol to form a t-butyloxycarbonylamino ester of the formula


(VII)

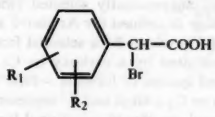
(e) solvilizing said t-butyloxycarbonylamino ester of the formula (VII) with isopropanol in the presence of an acid catalyst to form said isopropyl 3S-amino-2R-hydroxyalkanoate of the formula (I).

## 5,036,156
## PROCESS FOR THE PREPARATION OF α-BROMO-PHENYLACETIC ACIDS

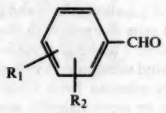
**Michel Bouisset, Sisteron, and Joël Radisson, Toulouse, both of France, assignors to Sanofi, Paris, France**

**Filed Jun. 19, 1990, Ser. No. 540,483**
**Claims priority, application France, Sep. 29, 1989, 89 12787**
**Int. Cl.[5] C07C *51/093, 51/00***
**U.S. Cl. 562—496** **8 Claims**

1. A process for the preparation of compounds of formula I:


I

in which $R_1$ and $R_2$, identical or different, each represents hydrogen or halogen, wherein an aldehyde of formula:


IV

in which $R_1$ and $R_2$ have the same meaning as in formula I, is reacted with $CHBr_3$ and KOH in a mixture of an inert solvent and water.

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## 5,036,157
## ARYL DERIVATIVES

**Geoffrey Kneen; William P. Jackson; Peter J. Islip, and Peter J. Wates, all of Beckenham, England, assignors to Burroughs Wellcome Co.**

**Continuation-in-part of Ser. No. 838,534, Mar. 11, 1986, abandoned. This application Mar. 10, 1987, Ser. No. 24,031**
**Int. Cl.[5] C07C *83/10*; C07D *231/00, 333/22***
**U.S. Cl. 562—623** **6 Claims**

1. A compound of formula (I)

$$Ar-(L-Ar')_q-(X)_k-(Y)_p-Q \quad (I)$$

wherein

k, p and q are independently 0 or 1, provided that when k is 1 then p must also be 1 further provided that when p is 1 or q is 1 or both p and q are 1;

Ar represents either:

(i) naphthyl, tetrahydronaphthyl, or pyridyl;

(ii) naphthyl, tetrahydronaphthyl, or pyridyl substituted by one or more substituents independently selected from $C_{1-4}$ alkyl, $C_{1-4}$ alkyl substituted by one or more halogen atoms, $C_{1-4}$ alkoxy, halo, nitro, amino, carboxy, $C_{1-4}$ alkoxycarbonyl and hydroxy;

(iii) phenyl, or

(iv) phenyl substituted by one or more substituents independently selected from phenyl, phenyl substituted by one or more substituents independently selected from $C_{1-4}$ alkyl, $C_{1-4}$ alkyl substituted by one or more halogen atoms, $C_{1-4}$ alkoxy, halo, nitro, amino, carboxy, $C_{1-4}$ alkoxycarbonyl and hydroxy; $C_{1-4}$ alkyl, $C_{1-4}$ alkyl substituted by one or more halogen atoms, $C_{1-4}$ alkoxy, halo, nitro, amino, carboxy, $C_{1-4}$ alkoxycarbonyl and hydroxy;

L is selected from $-(CH_2)_r-$ (where r is 1-4), —O—, $-CH_2O-$, $-CH_2S-$, $-OCH_2-$, —CONH—, —NHCO—, —CO— and $-CH_2NH-$, and Ar′ represents phenylene or thienylene either of which may be substituted by one or more substituents independently selected from $C_{1-4}$ alkyl, $C_{1-4}$ alkyl substituted by one or more

halogen atoms, $C_{1-4}$ alkoxy, halo, nitro, amino, carboxy, $C_{1-4}$ alkoxycarbonyl and hydroxy;

X represents oxygen, sulphur or carbonyl;

Y is $C_{1-10}$ alkylene or $C_{1-10}$ alkenylene;

Q represents a non-cyclic moiety of formula

in which $R^1$ is independently selected from hydrogen, $C_{1-4}$ alkyl, groups as defined for Ar above and groups of formula $—COR^3$ in which $R^3$ is selected from $C_{1-4}$ alkyl, $C_{1-4}$ alkyl substituted by a carboxy or $C_{1-4}$ alkoxycarbonyl group and groups of formula $—N(R^4)R^5$ in which $R^4$ is hydrogen or $C_{1-4}$ alkyl and $R^5$ represents hydrogen, $C_{1-4}$ alkyl, phenyl, or phenyl substituted by one or more halogen atoms, $C_{1-4}$ alkoxy, halo, nitro, amino, carboxy, $C_{1-4}$ alkoxycarbonyl and hydroxy, and $R^2$ is selected from hydrogen, $C_{1-4}$ alkyl, amino, $C_{1-4}$ alkylamino, di-$C_{1-4}$ alkylamino, $C_{5-7}$ cycloalkyl, $C_{5-7}$ cycloalkyl($C_{1-4}$alkyl-)amino, anilino, N-$C_{1-4}$ alkylanilino and groups as defined for Ar above; and salts thereof; with the proviso that:

(i) when q is 0, k is 0 or 1 and p is 1, Ar is phenyl, napthyl, or phenyl or naphthyl substituted by one or more substituents independently selected from $C_{1-4}$ alkyl, $C_{1-4}$ alkyl substituted by one or more halogen atoms, $C_{1-4}$ alkoxy, halo, nitro, amino, carboxy, $C_{1-4}$ alkoxy carbonyl and hydroxy and X is oxygen or sulphur (in the case when k is 1),

Y is $C_{1-10}$ alkylene and Q represents said non-cyclic moiety as hereinbefore defined in which one or $R^1$ and $R^2$ is hydrogen or $C_{1-4}$ alkyl;

then the other of $R^1$ and $R^2$ is neither hydrogen nor $C_{1-4}$ alkyl;

(ii) when $R^1$ is hydrogen or $C_{1-4}$ alkyl and $R^2$ is phenyl or phenyl substituted by a single substituent selected from $C_{1-4}$ alkyl, $C_{1-4}$ alkoxy, phenyl and phenyl substituted by one or more substituents independently selected from $C_{1-4}$ alkyl, $C_{1-4}$ alkyl substituted by one or more halogen atoms, $C_{1-4}$ alkoxy, halo, nitro, amino, carboxy, $C_{1-4}$ alkoxycarbonyl and hydroxy;

then at least one of k and p must be 1, and in the case when k is 0 and p is 1, Y must be $C_{1-10}$ alkenylene;

(iii) and when k is 0, p is 1 and Y is $C_{1-10}$ alkenylene, q is 0, Ar is unsubstituted phenyl and one of $R^1$ and $R^2$ is hydrogen,

then the other of $R^1$ and $R^2$ is other than hydrogen.

6. N-[3-(4-fluoro-3-phenoxyphenyl)prop-2-enyl]-N-hydroxy-N$^1$-methyl urea.

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**5,036,158**

## INTERMEDIATE COMPOUNDS FOR AN INSECTICIDAL AND ACARICIDAL PYRAZOLE COMPOUND

**Naoto Meki, Kobe, Japan, assignor to Sumitomo Chemical Company, Limited, Osaka, Japan**

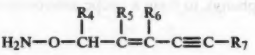
**Continuation-in-part of Ser. No. 569,223, Aug. 17, 1990, which is a continuation of Ser. No. 496,176, Mar. 20, 1990, abandoned, which is a continuation of Ser. No. 348,217, May 5, 1989, abandoned. This application Nov. 6, 1990, Ser. No. 609,622**

**Claims priority, application Japan, May 6, 1988, 63-111046; Jul. 15, 1988, 63-177749; Jan. 20, 1989, 1-12672; Feb. 27, 1989, 1-47344**

**Int. Cl.$^5$ C07D *239/20***

**U.S. Cl. 564—300** **5 Claims**

1. A compound represented by the formula (V):



(V)

wherein each of $R_4$, $R_5$ and $R_6$, which may be the same or different, is hydrogen, $C_1$–$C_3$ alkyl, or optionally two of them bonded together to form a $C_2$–$C_4$ alkylene chain; and $R_7$ is hydrogen; $C_1$–$C_8$ alkyl; $C_1$–$C_8$ chloro- or fluoro-alkyl; $C_2$–$C_8$ alkoxyalkyl or $C_3$–$C_8$ cycloalkyl or phenyl which may be substituted with $C_1$–$C_3$ alkyl, $C_1$–$C_3$ alkoxy, a chlorine or fluorine.

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**5,036,159**

## CRYSTALLINE OXIDES AS CATALYSTS

**Brent A. Aufdembrink, Wilmington, Del.; Arthur W. Chester, Cherry Hill, and Pochen Chu, Voorhees, both of N.J., assignors to Mobil Oil Corporation, Fairfax, Va.**

**Filed Jun. 30, 1989, Ser. No. 374,032**

**Int. Cl.$^5$ C07C *5/02, 2/52, 4/02***

**U.S. Cl. 585—275** **16 Claims**

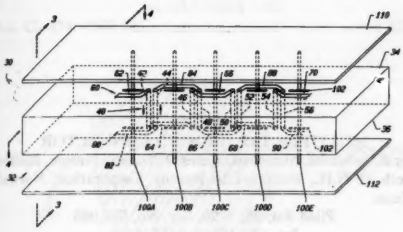
1. A process for converting a feed containing an aliphatic of at least 6 carbon atoms, comprising contacting said feed with a ternary oxide composition of copper and two metals other than copper each of said two metals other than copper being selected from the group consisting of ytrrium, barium, calcium, lanthanum, and strontium, which ternary oxide composition exhibits super conductivity temperature $T_c$ exceeding 77K, wherein said contacting is undertaken at a temperature of at least 1000° F. and recovering ethane, ethylene or admixtures thereof.

5,036,160

## TWISTED PAIR BACKPLANE

Joseph M. Jackson, Cupertino, Calif., assignor to Crosspoint Systems, Inc., Mountain View, Calif.

Filed Nov. 7, 1989, Ser. No. 432,472
Int. Cl.[5] H05K 1/02; H01B 11/08
U.S. Cl. 174—33 6 Claims



1. A backplane comprising:

a layer of insulation material;

a plurality of lead segments arranged in line and spaced from one another on a first surface of said insulation material;

a plurality of cooperating lead segments arranged in line and spaced from one another on a second surface of said insulation material;

means for interconnecting the ends of a first portion of alternate segments on said first and second surfaces to form a first continuous line alternating between lead segments on said first and second surfaces;

means for connecting the ends of a second portion of alternate segments on said first and second surfaces to form a second continuous line alternating between lead segments on said first and second surfaces separate from said first continuous line; said first and second continuous lines twisting along the axis of signal propagation to produce a twisted pair within said backplane;

a plurality of conductive shield layers located parallel with and adjacent to said first and second surfaces of the layer of insulation material;

a plurality of connecting rods connecting said plurality of shield layers through said insulation material; and

said shield layers being ground layers, said first and second continuous lines being internal thereto, said shield layers shielding said first and second continuous lines on two opposing sides.

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5,036,161

## TOP SHIELD ARRANGEMENT FOR FILTER TRAPS

Isaac Sachs, 1240 Ridgewood Drive, Chomedey, Laval Quebec, Canada H7W 1L3

Filed Mar. 26, 1990, Ser. No. 498,646
Claims priority, application Canada, Sep. 29, 1989, 614487
Int. Cl.[5] H01R 33/97, 13/44
U.S. Cl. 174—40 R 15 Claims

1. A top shield arrangement for elongated filter traps, comprising:

an elongated sleeve member adapted to receive through one end thereof at least one filter trap such that the filter trap lies completely inside said sleeve member;

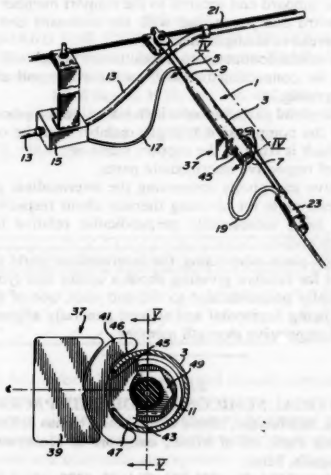
arresting means integral with said sleeve member a the other end thereof for preventing withdrawal of said filter trap from said other end; and

security means at said one end of preventing unauthorized removal of said filter trap from said sleeve member through said one end;

said security means comprising tamper evident means comprising an external detachable breakaway member and an internal retainer member;

whereby, detachment of said breakaway member indicates tempering; and

said internal retainer member prevents unauthorized removal of said filter trap from said sleeve member both



when said breakaway member is not detached and when said breakaway member is detached.

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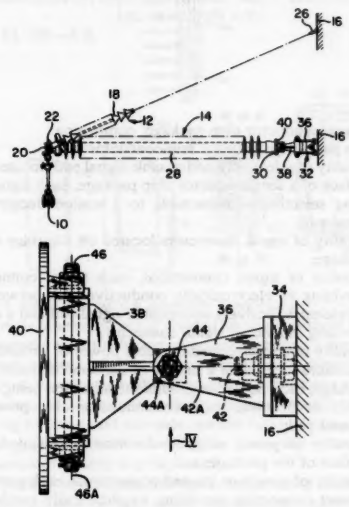
5,036,162

## TRIAXIAL MOUNT

Stefan S. Zajfert, Stafford, N.Y., assignor to Lapp Insulator Company, LeRoy, N.Y.

Filed Sep. 1, 1989, Ser. No. 402,351
Int. Cl.[5] H02G 7/05
U.S. Cl. 174—43 9 Claims



5. An assembly for supporting a load, the assembly comprising:

a support member;

a horizontally extended compressive strength member having an inboard end juxtaposed with the support member and an outboard end remote therefrom;

at least a first elongated tension strength member having an upper inboard end secured to the support member and an outboard end juxtaposed with the outboard end of the compressive strength member;

a yoke at and connected to the outboard ends;

means for connecting the load to the yoke; and a mount comprising

a pair of end parts, one of which is fixed to the inboard end of the compressive strength member and the other of which is fixed to the support member;

a pair of respective intermediate parts;

respective end pivots connecting the intermediate parts to the end parts for pivoting thereon about respective end axes lying substantially perpendicular relative to each other; and

a central pivot connecting the intermediate parts to each other for relative pivoting about a center axis lying substantially perpendicular to the end axes, one of the end axes being horizontal and at least generally aligned with the compressive strength member.

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**5,036,163**

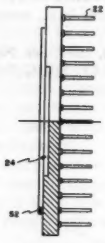
## UNIVERSAL SEMICONDUCTOR CHIP PACKAGE

**Richard K. Spielberger, Maple Grove, and Thomas J. Dunaway, St. Louis Park, all of Minn., assignors to Honeywell Inc., Minneapolis, Minn.**

**Division of Ser. No. 421,364, Oct. 13, 1989, which is a continuation-in-part of Ser. No. 112,851, Oct. 23, 1988, abandoned. This application Nov. 13, 1990, Ser. No. 612,805**

**Int. Cl.[5] H01L** *23/02*

**U.S. Cl. 174—52.4** **6 Claims**




1. A semiconductor chip package, comprising:

a chip pad for receiving a semiconductor chip;

a plurality of selectively-addressable signal pads located on a surface of a semiconductor chip package, each signal pad being selectively connectable to a semiconductor chip signal pad;

a plurality of signal connectors located on a surface of the package;

a plurality of signal connections, each signal connection providing an electronically conductive path between an individual, selectively-addressable signal pad and a corresponding individual signal connector;

a plurality of selectively-addressable power or ground metallizations located on a surface of the semiconductor chip package, each power or ground metallization being selectively connectable to a semiconductor chip power or ground pad;

a plurality of power or ground connectors located on a surface of the package; and

a plurality of power or ground connections, each power or ground connection providing an electrically conductive path between an individual, selectively-addressable power or ground metallization and a corresponding individual power or ground connection;

the resistance and inductance values of the electronically conductive path from each selectively-addressable power or ground metallization to a corresponding power or ground connector being substantially less than the resistance and inductance values of the electronically conductive path from each selectively-addressable signal pad to a corresponding signal connector.

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**5,036,164**

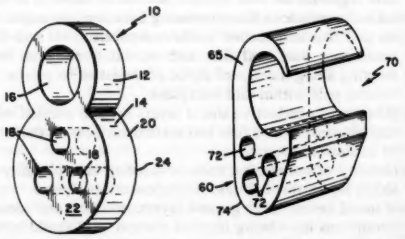
## MULTIPLE TAP GROUND CONNECTOR

**Gary E. Schrader, Manchester, and H. Thomas Nelson, Bedford, both of N.H., assignors to Burndy Corporation, Norwalk, Conn.**

**Filed Jul. 25, 1990, Ser. No. 558,005**

**Int. Cl.[5] H01R** *4/18, 4/66*

**U.S. Cl. 174—94 R** **6 Claims**




1. A metallic ground connector capable of being crimped comprising a unitary body with rear and front faces in the form of a figure-six having a C-shaped upper body portion defining an opening for receiving a ground rod and a generally solid lower body portion defined by a side wall and having a plurality of openings substantially equal in size and of a size smaller than the upper body portion opening extending interiorly of the lower body portion side wall between the rear and front faces for receiving a plurality of tap wires so that the connector can interconnect the ground rod and the plurality of tap wires in a single crimping action.

4. A metallic ground connector capable of being crimped comprising an integral body member having rear and front faces and having a generally cylindrical first body portion defined by an upper side wall and a generally cylindrical second body portion defined by a lower side wall with the first body portion and second body portion joined in a figure-eight configuration, the first body portion having an opening therein extending from the front face through the rear face and interiorly of the side wall thereof for receiving a ground rod, and a plurality of openings substantially equal in size and of a size smaller than the upper body portion opening formed in the second body portion and extending from the front to rear faces interiorly of the side wall periphery thereof for receiving a plurality of ground wires of common size so that the connector when crimped secures the rod and wires.

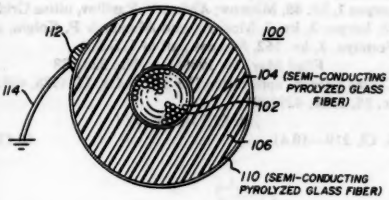
## 5,036,165
## SEMI-CONDUCTING LAYER FOR INSULATED ELECTRICAL CONDUCTORS

**Richard K. Elton, Altamont, and William R. Schultz, Jr., Schenectady, both of N.Y., assignors to General Electric Co., Schnectady, N.Y.**

**Division of Ser. No. 351,235, May 15, 1989, which is a division of Ser. No. 643,908, Aug. 23, 1984, Pat. No. 4,853,565. This application Jul. 23, 1990, Ser. No. 555,713**

**Int. Cl.[5] H01B** *9/02*

**U.S. Cl. 174—102 SC** **2 Claims**




1. A cable adapted to carry electrical current therein comprising:

an electrical conductor;

an insulator substantially surrounding said conductor, and

an internal grading layer including a semi-conducting pyrolyzed organic material and glass fiber layer having a resistivity in the range of 200 to 10,000,000 ohms per square in electrical contact with said conductor.

2. A cable as in claim 1 further including means for maintaining a substantially uniform electrical potential over said cable's expanse which includes a semi-conducting pyrolyzed organic material and glass fiber layer, having a resistivity in the range of 200 to 10,000,000 ohms per square, being in intimate contact with the exterior surface of said insulator and being in electrical contact with a coupling means having a predetermined electrical potential.

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## 5,036,166
## ELECTRIC FENCE LINE

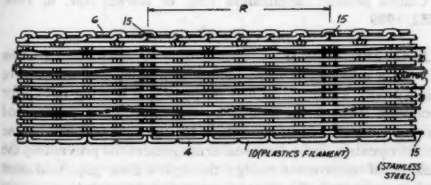
**Dion V. Monopoli, Nelson, New Zealand, assignor to Gallagher Electronics Limited, Hamilton, New Zealand**

**Continuation-in-part of Ser. No. 306,276, Feb. 1, 1989, abandoned, which is a continuation of Ser. No. 81,705, Aug. 4, 1987, abandoned. This application Dec. 12, 1989, Ser. No. 448,955**

**Claims priority, application New Zealand, Aug. 11, 1986, 217168**

**Int. Cl.[5] H01B** *5/08, 7/00;* **A01K** *3/00*

**U.S. Cl. 174—128.1** **19 Claims**




12. An electric fence line comprising a flexible and substantially stretch resistant support member at least two spaced conductive filaments spaced apart but in close proximity each of the said at least two conductive filaments having distinct mechanical and electrical qualities with a first of the filaments having superior electrical conductivity while a second of the filaments has superior resistance to fatigue, the arrangement and construction being such that in use in the event of breakage of said first filament the probability is that the second filament will remain unbroken with current bridging occurring between the broken and unbroken filament minimizing conductivity losses.

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## 5,036,167
## BOARD FOR HYBRID INTEGRATED CIRCUIT

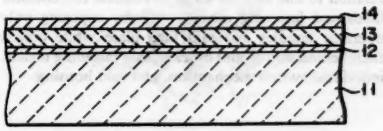
**Norio Kasai, Yokohama, Japan, assignor to Toshiba Lighting & Technology Corporation, Tokyo, Japan**

**Filed Sep. 6, 1989, Ser. No. 402,854**

**Claims priority, application Japan, Sep. 7, 1988, 63-222413**

**Int. Cl.[5] H05K** *1/00*

**U.S. Cl. 174—256** **4 Claims**




1. A board for a hybrid integrated circuit, comprising:

a ceramic substrate;

a copper plate having a thickness of between 1 to 100 μm directly bonded to said ceramic substrate by a heat treatment in a non-oxide atmosphere;

an insulating layer having a thickness of between 10 to 100 μm and formed on the copper plate by a screen printing method; and

a wiring layer having thickness of between 5 to 80 μm and formed on the insulating layer by a screen printing method.

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## 5,036,168
## MULTI-UNIT SWITCH ASSEMBLY

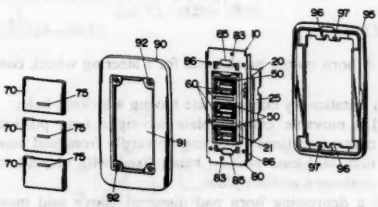
**Atsushi Kikuchi, and Yoshiyuki Tatsuo, both of Obihiro, Japan, assignors to Matsushita Electric Works, Ltd., Japan**

**Filed Aug. 31, 1989, Ser. No. 401,233**

**Claims priority, application Japan, Sep. 9, 1988, 63-227223**

**Int. Cl.[5] H01H** *9/02*

**U.S. Cl. 200—5 R** **7 Claims**




1. A multi-unit switch assembly comprising:

a single housing which is divided into a plurality of compartments respectively accommodating therein a corresponding number of switch mechanisms, each switch mechanism having a movable contact and at least one stationary contact; an actuator rockably mounted within said housing to move said movable contact into and out of contact engagement with at least one stationary contact, said actuator having a spring catch;

a plurality of operator handles corresponding in number to the number of said switch mechanisms, each operator handle being located exteriorly of said housing and detachably connected to said actuator of each switch mechanism by snap engagement with said spring catch so that

the operator handle is rockable together with said actuator;

a mount bracket for mounting said switch assembly to a fixed wall surface, said mount bracket being secured to the upper surface of said housing and having a window through which said actuators are exposed for snap engagement with the corresponding operator handles;

a face plate placed over said mount bracket and detachably secured to said mounting bracket by fastening means, said face plate having an opening through which said operator handles are detachably coupled to the corresponding actuators, said face plate being formed at corners of said opening with lands for retaining said fastening means, said opening bearing configured such that said operator handles are arranged within said opening in a closely adjacent relation to one another so as to conceal therebehind said lands and fastening means, whereby exposing only the operator handles and said face plate while concealing therebehind said mount bracket, said fastening means, said individual switch mechanisms, and said housing.

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**5,036,169**

**STEERING WHEEL HORN SWITCH**

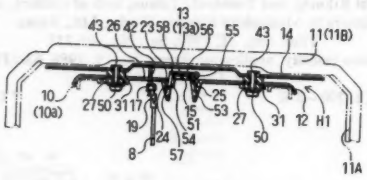
**Katsunobu Sakane, Ichinomiya, Japan, assignor to Toyoda Gosei Co., Ltd., Nishikasugai, Japan**

**Filed Mar. 22, 1990, Ser. No. 497,319**

**Claims priority, application Japan, Mar. 27, 1989, 1-34476[U]; Aug. 31, 1989, 1-102253 [U]**

**Int. Cl.[5] H01H *9/00*; B62D *1/04***

**U.S. Cl. 200—61.54** **9 Claims**




1. A horn switch mechanism for a steering wheel, comprising:

(a) a stationary contact plate having a locking hole;

(b) a movable contact plate having a base portion and contact portions extending upwardly from said base portion, said base portion being fixed with respect to said stationary contact plate;

(c) a depressing horn pad disposed above said moveable contact plate; and

(d) an electrical insulation spacer disposed between said stationary contact plate and said movable contact plate, said electrical insulation spacer comprising a base member, a projection piece for holding said base portion of said movable contact plate in cooperation with said base member, said projection piece projecting from said base member, said projection piece being interconnected to said base member through a thin, hinge portion, and a pair of locking legs, said locking legs being engagable with a peripheral edge of said locking hole of said stationary contact plate, one of said locking legs being provided on said base member, the other of said locking legs being provided on said projection piece.

**5,036,170**

**METHOD FOR CLEANING FERROMAGNETIC CHIP FROM A LUBRICANT-COOLANT AND AN APPARATUS FOR CARRYING OUT THE METHOD**

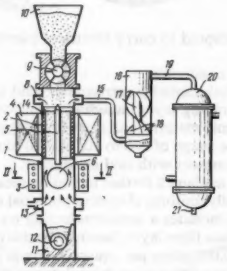
**Boris G. Arabei, ulitsa Energeticheskaya, 8, korpus 3, kv. 44; Sergei B. Kostyrev, ulitsa Konenkova, 21a, kv. 123, both of Moscow; Alexandr S. Mints, mikroraion imeni Dzerzhinskogo, TSOVB, 2, kv. 13, Moskovskaya oblast; Lev A. Pronin, ulitsa Melnikova, 27, kv. 150, Moscow; Dmitry I. Ryzhonkov, ulitsa Novatorov, 40, korpus 12, kv. 10, Moscow; Sergei A. Sopochkin, ulitsa Junykh Lenintsev, 75, korpus 3, kv. 16, Moscow; Sergei A. Stepnov, Altufievskoe Shosse, 78, kv. 201, Moscow; Vladimir L. Esikman, ulitsa Krasnogo Mayaka, 1, korpus 1, kv. 48, Moscow; Andrei V. Vasiliev, ulitsa Grishina, 23, korpus 3, kv. 2, Moscow, and ALexandr P. Kolgin, ulitsa Pestelya, 2, kv. 162, Moscow, all of U.S.S.R.**

**Filed Mar. 14, 1989, Ser. No. 323,388**

**Claims priority, application U.S.S.R., Mar. 15, 1988, 4392275; Mar. 15, 1988, 4392291**

**Int. Cl.[5] H05B *6/14***

**U.S. Cl. 219—10.41** **10 Claims**



1. A method of cleaning ferromagnetic chips from a lubricant-coolant, comprising:

conveying the chips to a heating zone;

in the heating zone, heating the chips to a temperature within a range of temperatures from 105° C. to 310° C. and simultaneously applying a rotating electromagnetic field thereto;

and holding the chips within said range of temperatures under the action of said rotating electromagnetic field for a predetermined time period.

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**5,036,171**

**ELECTROMAGNETIC WAVE ENERGY SEAL ARRANGEMENT**

**Eung S. Kim; Byung J. Kim, and Seong J. Ahn, all of Seoul, Rep. of Korea, assignors to Goldstar Co., Ltd., Seoul, Rep. of Korea**

**Filed Apr. 6, 1990, Ser. No. 505,513**

**Claims priority, application Rep. of Korea, Apr. 6, 1989, 4552/1989**

**Int. Cl.[5] H05B *6/76***

**U.S. Cl. 219—10.55 D** **1 Claim**

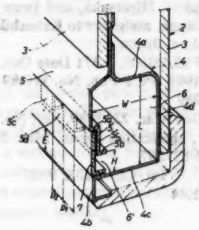
1. In a microwave oven including a source of microwave energy with a predetermined frequency, a heating cavity for receiving items to be heated by the microwave energy and having an access opening, a door for opening and closing the access opening, and a door seal arrangement for preventing the leakage of microwave energy through a door gap, said door seal arrangement of a microwave oven comprising:

a recessed chamber having a choke function, said recessed chamber being defined substantially rectangular configuration by an internal plate member and an external plate member, the length of said recessed chamber being substantially $\lambda/4$ of the effective wavelength for minimizing the leakage path of the microwave energy in the longitudinal direction,

a stepped portion formed by said internal plate member, said

stepped portion having upper and lower horizontal portions, a vertical portion, and first and second capacitive seals for changing its capacitance by said stepped portion, whereby the propagation path makes a characteristic impedance different from each other,

a plurality of slots formed at said lower horizontal portion and said vertical portion of said internal plate member, said plurality of slots being formed at predetermined periodical intervals, whereby a band stopping filter is gained



for suppressing the microwave energy proceeding to the x-direction,

a C-shaped member disposed at the bottom end portion of said external plate member for forming the second capacitive seal between a front panel of said heating cavity, and

a choke cover for blocking an opening of said recessed chamber, said choke cover being located between said C-shaped member and said lower horizontal portion of said stepped portion.

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**5,036,172**

## METHOD AND DEVICE FOR DETERMINING WHEN A FOOD HAS THAWED IN A MICROWAVE OVEN

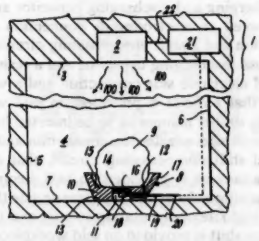
**Franciscus Kokkeler, Mainate, Italy; Mats Idebro, Norrköping, Sweden; Enzo Cigarini, Brebbia, and Mario Fioroli, Brezzo di Bedero, both of Italy, assignors to Whirlpool International B.V., Eindhoven, Netherlands**

**Filed Sep. 20, 1989, Ser. No. 410,391**

**Claims priority, application Italy, Sep. 23, 1988, 22062 A/88**

**Int. Cl.[5] H05B *6/68***

**U.S. Cl. 219—10.55 M** **15 Claims**



1. A method for determining when a food has thawed in a microwave oven comprising the steps of placing food (9) in a support (8) in a microwave oven (1) and exposing said food to microwaves generated therein, wherein the food (9) is placed above an element (14) constructed of a microwave-sensitive material, said food (9) sheilding said element (14) from the microwaves to a different extent according to its degree of thawing, the temperature attained by said material by the absorption of said microwaves being measured by transducer means (18) which receive a signal operationally related to said temperature and which on the basis of said signal halt the thawing when said temperature has reached a suitable value.

**5,036,173**

## ELECTRICAL DISCHARGE APPARATUS WITH A DIELECTRIC FLUID ASSEMBLY

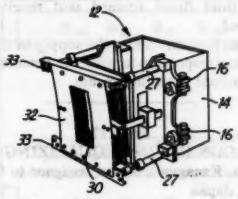
**Geoffrey Wilson, Chesterfield, and Gareth A. Evans, Sheffield, both of England, assignors to Sarclad International Limited, Chesterfield, England**

**Filed Nov. 22, 1989, Ser. No. 441,103**

**Claims priority, application United Kingdom, Nov. 23, 1988, 8827342**

**Int. Cl.[5] B23H *1/00, 9/04***

**U.S. Cl. 219—69.11** **10 Claims**



1. Electrical discharge apparatus for use when machining or applying a textured finish to a surface of a workpiece, the apparatus comprising a receptacle for containing dielectric fluid which is closed on all sides excepting that side which, in use of the apparatus, engages the adjoining surface of the workpiece, the open side of the receptacle carrying a flexible structure which can be moved towards and away from the workpiece surface between a first position in which the open side of the receptacle is spaced from the workpiece and a second position in which the workpiece surface closes off the open side of the receptacle, the flexible structure carrying at its edge surface a resilient member whose contour can be varied to match the contour of the workpiece.

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**5,036,174**

## WIRE ELECTRODE SUPPLYING APPARATUS FOR WIRE ELECTRIC DISCHARGE MACHINE

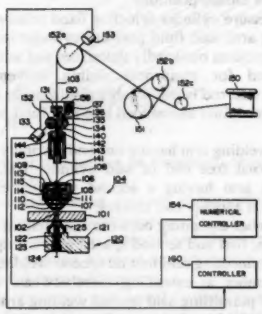
**Takeshi Iwasaki; Takeshi Yatomi, and Akihiro Sakai, all of Nagoya, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 20, 1990, Ser. No. 511,702**

**Claims priority, application Japan, Apr. 28, 1989, 1-111703; Apr. 28, 1989, 1-111704**

**Int. Cl.[5] B23H *7/10***

**U.S. Cl. 219—69.12** **20 Claims**




1. A wire electrode supplying apparatus for a wire electric discharge machine, comprising:

a feeding section for feeding a wire electrode;

a feeding-side guide section through which the wire electrode fed from said feeding section is passed through and

which is adapted to constrain the direction of movement of the wire electrode;

a receiving-side guide section for guiding the wire electrode, said receiving-side guide section being disposed in such a manner as to oppose said feeding-side guide section, and the wire electrode fed from said feeding-side guide section being passed through said receiving-side guide section;

a feeding amount detecting means for detecting an amount of the wire electrode fed from said feeding section;

a jet nozzle for constraining the direction of movement, toward said receiving-side guide section, of the wire electrode fed from said feeding-side guide section, as a jet of working fluid flows toward said receiving-side guide section; and

control means for controlling the supply of the jet to said jet nozzle in correspondence with the detected result of said feeding amount detecting means.

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**5,036,175**

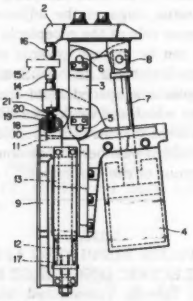
## WELDING GUN HAVING EQUALIZING FUNCTION

**Shigeru Umeda, Kanagawa, Japan, assignor to Obara Corporation, Tokyo, Japan**

**Filed May 25, 1990, Ser. No. 528,924**

**Int. Cl.[5] B23K *11/10***

**U.S. Cl. 219—89** **5 Claims**



1. A welding gun, comprising:

a base;

a first welding arm supported on said base for sliding movement relative to said base along an axis of said base, said first welding arm having a welding electrode supported on one end thereof;

spring means coacting between said base and said first welding arm for yieldably biasing said first welding arm toward a closed position;

a fluid pressure cylinder which is fixed relative to said first welding arm, said fluid pressure cylinder including a rod which projects outwardly therefrom and which is slidably supported for reciprocal sliding movement relative thereto, said rod being slidably displaceable in response to pressurized fluid introduced into said fluid pressure cylinder;

a second welding arm having one end pivotally connected to an external free end of said cylinder rod, said second welding arm having a second welding electrode supported on another end thereof;

a link member extending between said first nd second welding arms, first and second spaced pivots respectively pivotally connecting said first nd second welding arms to said link member as extending therebetween, and said link member permitting said second welding arm to be driven by said slidable cylinder rod for movement relative to said first welding arm between an open position in which said second electrode is spaced from said first electrode and a closed position in which said second electrode is in closely opposed relationship with said first electrode; and

means for interlocking said first and second welding arms at a predetermined time during opening movement of said second welding arm for causing said first welding arm to be locked and integrally carried with said second welding arm against the urging of said spring means for the remainder of said opening movement of said second welding arm.

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**5,036,176**

## PLASMA ARC CUTTER AND METHOD OF CONTROLLING THE SAME

**Yoshihiro Yamaguchi, Hiratsuka, and Iwao Kuorkawa, Yokohama, both of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan**

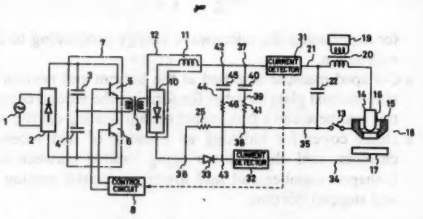
**PCT No. PCT/JP89/00305, § 371 Date Oct. 18, 1989, § 102(e) Date Oct. 18, 1989, PCT Pub. No. WO89/09110, PCT Pub. Date Oct. 5, 1989**

**PCT Filed Mar. 23, 1989, Ser. No. 427,106**

**Claims priority, application Japan, Mar. 24, 1988, 63-70079; May 24, 1988, 63-127387**

**Int. Cl.[5] B23K *9/00***

**U.S. Cl. 219—121.44** **17 Claims**



1. A plasma arc cutter having an inverter circuit for converting a commercial alternating current into a predetermined high frequency alternating current, a rectifying circuit connected to an output of said inverter circuit, a smoothing reactor connected in series to said rectifying circuit, an electrode of a plasma torch connected to the cathode side of a serial circuit composed of said rectifying circuit and said smoothing reactor via a coupling coil for generation of an arc starting high-frequency voltage, a workpiece connected to the anode side of said serial circuit, and a nozzle of said plasma torch similarly connected to said anode side via a first resistor and a first switch, said plasma arc cutter being characterised in that, with respect to said serial circuit composed of said rectifying circuit and said smoothing reactor, a rise compensating circuit composed of a charging and discharging capacitor and a resistor is inserted between an electrode-side connection and a nozzle-side connection and a shift compensating circuit composed of a charging and discharging capacitor and a resistor is inserted between said electrode side connection and a workpiece-side connection, that a diode is provided on said workpiece-side connection in such a manner as to be inserted between a connection point of said nozzle-side connection and a connecting point of said shift compensating circuit, that a detector for controlling a current is provided on said electrode-side connection at a position closer to the electrode side than a connecting point of said rise compensating circuit, and that a detector for detecting a shift is provided on said workpiece-side connection at a position closer to the workpiece side than said connecting point of said shift compensating circuit.

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**5,036,177**

## METHOD FOR REDUCING HAZARDS DUE TO LOW FREQUENCY ELECTRIC AND MAGNETIC FIELDS

**John A. Pagliarini, Jr., P.O. Box 2458, Ocean Bluff, Mass. 02065**

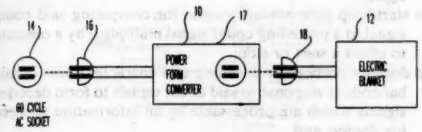
**Filed May 16, 1990, Ser. No. 525,087**

**Int. Cl.[5] H05B *3/34***

**U.S. Cl. 219—212** **3 Claims**

1. A method for reducing the 60 Hz electric and magnetic

fields associated with an AC electric blanket wherein said AC electric blanket has an input power plug originally intended for connection to an AC power source, and has a power supply control circuit coupled to said input power plug for providing controlled AC power to the heating element thereof, said method comprising the steps of:




disconnecting said input power plug of said AC electric blanket from said AC power source;

converting said 60 Hz AC power form from said AC power source to a second power form, said second power form having a reduced component of 60 Hz AC power; and

applying said second power form to said input power plug of said AC electric blanket.

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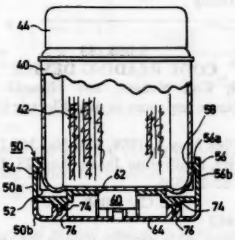
**5,036,178**

## HEATER UNIT FOR HEATING CONTAINER FOR MOIST TISSUES

**Israel Orbach, 15 Hameyasdim Str., 30900 Zichron Yaacov, Israel**

**Filed Mar. 14, 1990, Ser. No. 493,168**
**Claims priority, application Israel, Mar. 17, 1989, 89646**
**Int. Cl.[5] H05B *3/74***
**U.S. Cl. 219—385** **11 Claims**



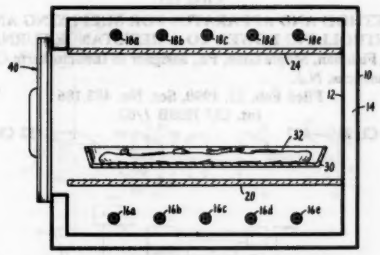

1. A heater unit for heating a supply of moist tissues within a container, comprising: a housing having a top wall for receiving the moist-tissue container, and a bottom wall for stably supporting the housing, and the moist-tissue container when received thereon, on a flat horizontal surface; said housing comprising two sections secured together, with one section including the housing top wall for receiving the moist-tissue container, and the other section including the housing bottom wall for stably supporting the housing on a flat horizontal surface; one of said housing sections comprising a plurality of pins extending parallel to the longitudinal axis of the housing, and the other housing section comprising a plurality of bores for receiving said pins with a friction fit; and an electrical heater element at the upper end of the housing to heat the moist-tissue container when supported on said housing top wall.

**5,036,179**

## VISIBLE LIGHT AND INFRA-RED COOKING APPARATUS

**Eugene R. Westerberg, Palo Alto, and Robert I. Beaver, II, Atherton, both of Calif., assignors to Quadlux, Inc., Atherton, Calif.**

**Continuation-in-part of Ser. No. 195,967, May 19, 1988. This application May 12, 1989, Ser. No. 350,024**
**Int. Cl.[5] F27B *9/06***
**U.S. Cl. 219—411** **22 Claims**




1. An oven for cooking a food item having a first temperature, wherein the oven comprises:

a) means for generating at least 5 KW of radiant energy in the electromagnetic spectrum, wherein significant portion of the radiant energy has a wavelength in the range of 0.4 μm to 0.7 μm and at least 90% of the radiant energy has a wavelength less than 1.0 μm; and

b) means for directing the energy to impinge directly on the food in order to bring the food to a second temperature, the second temperature being higher than the first temperature, the means for directing comprising an enclosure surrounding the means for generating having an outer surface and an inner surface, the inner surface being reflective of the radiant energy.

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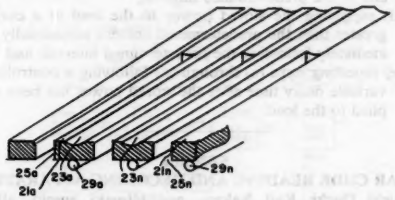
**5,036,180**

## ELECTRICAL INDOOR BROILER

**Clyde M. Scott, Gahanna, Ohio**

**Filed Mar. 1, 1983, Ser. No. 449,872**
**Int. Cl.[5] H05B *3/70*; F24C *7/06***
**U.S. Cl. 219—443** **3 Claims**




1. A broiler comprising an elongated, rectangularly shaped support structure,

an electrical heating element structurally supported and positioned in said structure,

a source of electrical potential and plug-in means connected to said heating element for utilization of the electrical potential from said source,

a single structure grid panel having parallel longitudinal slots formed therein along a length thereof,

said electrical heating element comprising a plurality of longitudinal elements in touch contact with an underside of said grid panel in a position intermediate of each of said slots and wherein said longitudinal elements are removed from exposure to said slots in said grid panel;

said grid panel intermediate said slots having grooves formed therein longitudinally and parallel to said slots and wherein said grid panel has an opening in one end thereof and said grooves are slanted toward said opening,

an outside portion of said grooves having a ridge configuration,

a water pan of a diameter and width at least as great as that of the aforesaid heating element and grid panel, positioned in a lower portion of said support structure for said broiler directly beneath the grid panel and heating element.

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**5,036,181**

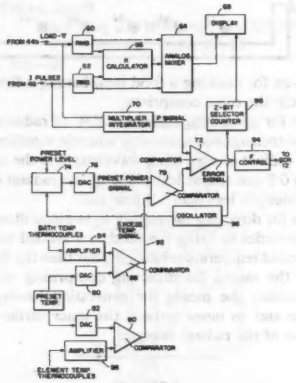
**METHOD AND APPARATUS FOR SUPPLYING AND CONTROLLING POWER TO A RESISTANCE FURNACE**

**Oleg Fishman, Maple Glen, Pa., assignor to Inductotherm Corp., Rancocas, N.J.**

**Filed Feb. 22, 1990, Ser. No. 483,186**

**Int. Cl.[5] H05B *1/02***

**U.S. Cl. 219—497** **12 Claims**



1. A method controlling the power supplied to a resistive load, comprising the steps of:

(a) supplying power at a predetermined current directly from a source to the load for a predetermined interval;

(b) simultaneously storing power external to the load;

(c) interrupting the power supplied directly to the load at the end of the predetermined interval;

(d) supplying the stored power to the load at a current greater than the predetermined current substantially immediately following the predetermined interval; and

(e) repeating steps (a) through (d) following a controllably variable delay time after the stored power has been supplied to the load.

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**5,036,182**

**BAR CODE READING AND DECODING APPARATUS**

**Junichi Ouchi; Koji Nakase, and Hiroaki Sasaki, all of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan**

**Filed Mar. 17, 1989, Ser. No. 324,853**

**Claims priority, application Japan, Jun. 21, 1988, 63-151306**

**Int. Cl.[5] G06K *7/01, 5/00***

**U.S. Cl. 235—462** **5 Claims**

1. A bar code reading and decoding apparatus comprising:

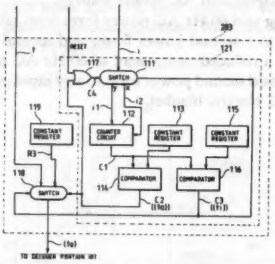
a photoelectric converter portion for reading a bar code and converting said bar code into binary-coded signals, said bar code having a plurality of character codes separated by character space codes between start codes and stop codes which are optically indicated by bars and spaces arranged alternately on a medium;

an edge detector portion for detecting the boundary between one said space and one said bar in accordance with said binary-coded signals from said photoelectric converter portion and for outputting an edge signal upon detection of said boundary;

a counter portion for counting, on the basis of a clock signal, the time interval between successive edge signals output from said edge detector portion and outputting a count signal;

a start/stop determining portion for comparing said count signal to a preceding count signal multiplied by a constant to effect a start or stop;

a decoder portion for decoding said character codes of said bar code in response to said count signals to form decoded signals which are processable by an information processing device; and



a character space processing portion including a character space detection portion for counting the number of edges represented by said edge signals from said edge detecting portion and comparing said edge number to a stored character length signal representing the number of edges corresponding to one character code, so as to identify said character space codes between said character codes, thereby outputting a partition code detection signal, and said character space processing portion further including a decode control means for prohibiting the decoding operation of said decoder portion in accordance with said partition code detection signal, thereby preventing erroneous decoding.

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**5,036,183**

**CODE READING DEVICE**

**Junichi Ouchi; Koji Nakase, and Hiroaki Sasaki, all of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan**

**Filed May 5, 1989, Ser. No. 348,228**

**Claims priority, application Japan, Aug. 25, 1988, 63-209535; Aug. 25, 1988, 63-209536**

**Int. Cl.[5] G06K *7/10***

**U.S. Cl. 235—462** **2 Claims**

1. An improved code reading device for reading bar code having bars and spaces, said bars and spaces having widths and said widths being either narrow or wide, said code reading device comprising:

means for reading said bar code and for providing time measurement signals related to the widths of the bars and spaces;

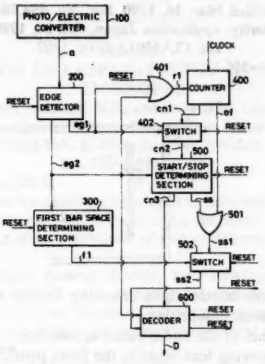
threshold determining means coupled to said bar code reading means for receiving time measurement signals and determining a threshold value;

means coupled to said bar code reading means for comparing said time measurements signals with said threshold value to identify wide width and narrow width bars and spaces and decoding said identified wide and narrow bars and spaces into associated characters;

wherein said threshold value determining means comprises:

means for determining a smallest wide bar/wide space

time measurement signal and a largest narrow bar/narrow space time measurement signal from a predetermined number of time measurement signals; and




means for averaging said smallest wide bar/wide space time measurement signal and said largest narrow bar/narrow space time measurement signal to produce said threshold value.

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**5,036,184**

## CARD READER USING LINEAR CARD CONVEYER MEANS

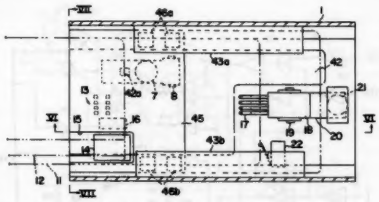
**Hitoshi Sasaki, Kanagawa, Japan, assignor to NHK Spring Co., Ltd., Yakohama, Japan**

**Filed Nov. 28, 1988, Ser. No. 276,616**

**Claims priority, application Japan, Nov. 27, 1987, 62-299606; Jan. 28, 1988, 63-17965**

**Int. Cl.[5] G06K *13/04***

**U.S. Cl. 235—479** **8 Claims**



1. A card reader for reading coded information from, and optionally writing coded information into, a card, said card reader comprising:

a casing;

a carriage received in said casing so as to be moveable between a card inserting position and an information accessing position;

electrically actuated clamp means carried by said carriage for securing a card, from which information is to be read, to said carriage;

activating means operable upon insertion of a said card into said casing to actuated said clamp means and secure a said card to said carriage;

linear conveyer means for selectively moving said carriage between said card inserting position and said information accessing position upon the actuation of said clamp means; and

information accessing means disposed adjacent said information accessing position to read information from said card carried by said carriage at said information accessing position.

**5,036,185**

## OPTICAL APPARATUS FOR DETECTING A FOCUSING STATE

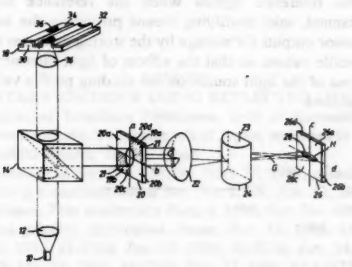
**Hideo Ando, Kanagawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan**

**Filed Dec. 26, 1989, Ser. No. 456,427**

**Claims priority, application Japan, Dec. 27, 1988, 63-327580; Dec. 27, 1988, 63-327582; Dec. 27, 1988, 63-327583; Dec. 27, 1988, 63-327584**

**Int. Cl.[5] G01J *1/20***

**U.S. Cl. 250—201.5** **23 Claims**



1. A light detecting apparatus, comprising:

means for receiving light travelling in a predetermined direction;

means for extracting a portion of the received light to form a light pattern;

means for reshaping the light pattern; and

photo-detecting means including four photo-detecting cells arranged as quadrants of a plane, for receiving the reshaped light pattern and detecting information data from said received light pattern.

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**5,036,186**

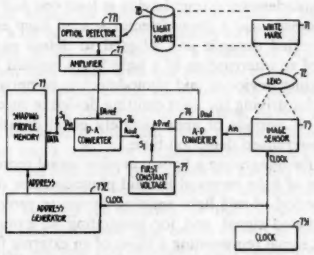
## SHADING CORRECTION SYSTEM FOR USE WITH AN OPTICAL SCANNER

**Chyi Tsao, Taipei, Taiwan, assignor to ACER Incorporated, Taipei, Taiwan, Taiwan**

**Filed Apr. 26, 1990, Ser. No. 514,756**

**Int. Cl.[5] H01J *40/14***

**U.S. Cl. 250—208.1** **11 Claims**




1. A shading correction system for use with an optical scanner that includes (a) a reference target, (b) a light source for supplying light to the reference target and an actual target to be scanned so that the light supplied is modulated by the reference target and the actual target, (c) an image sensor for scanning light modulated by the reference target and light modulated by the actual target to provide outputs, and (d) means for storing as shading profile values the sensor outputs or signals derived therefrom when the reference target is scanned, each shading profile value stored being the sensor output or a signal

derived therefrom when the image sensor is at a particular position in scanning motion, said system comprising:

an optical detector for sensing light from the light source when said source is supplying light to either one or both targets, said optical detector providing light variation reference signals for indicating variation of light intensity of light supplied by the source; and

means responsive to the light variation reference signals for modifying the outputs of the image sensor to provide modified outputs, wherein said modifying means modified the image sensor outputs as a function of the light variation reference signals when the reference target is scanned, said modifying means providing the modified sensor outputs for storage by the storing means as shading profile values, so that the effects of light intensity variations of the light source on the shading profile values are reduced.

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**5,036,187**

**PHOTODETECTING CIRCUIT WITH COMPENSATED INTEGRATION SIGNAL**

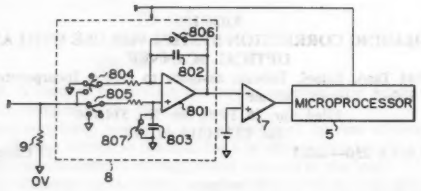
**Shigeo Yoshida, and Isamu Fujimoto, both of Chiba, Japan, assignors to Dowa Mining Co., Ltd., Tokyo, Japan**

**Filed May 2, 1990, Ser. No. 517,769**

**Claims priority, application Japan, May 8, 1989, 1-114648**

**Int. Cl.[5] G01V *9/04*; H01J *40/14***

**U.S. Cl. 250—214 B** **2 Claims**




2. A photodetector circuit having at least one pair of a light emitting device and a photodetector spaced from each other for a specified distance and adapted to detect presence or absence of an interruption of a light beam emitted from said light emitting device to said photodetector, comprising:

means for driving the light emitting device in successive on and off periods of approximately equal duration, for a predetermined detection time;

means for integrating a light reception signal representing a value of light received by said photodetector during the on period of said light emitting device to provide a first integrated signal, and for integrating an external flood light signal representing a value of an external flood light received by said photodetector during the off period of said light emitting device to provide a second integrated signal;

means for producing a compensated integration signal by deducting said second integrated signal from said first integrated signal during each of the off periods of the detection time; and

means for comparing said compensated integration signal with a reference signal to detect the presence or absence of the interruption in said light beam during the detection time.

**5,036,188**

**REMOTE-CONTROL-LIGHT DETECTING DEVICE FOR AV APPARATUS**

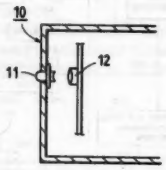
**Noboru Keitoku, Tokyo, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan**

**Filed Mar. 16, 1990, Ser. No. 494,284**

**Claims priority, application Japan, Jul. 24, 1989, 1-86733[U]**

**Int. Cl.[5] H01J *3/14, 5/02***

**U.S. Cl. 250—216** **9 Claims**




1. A remote-control-light detecting device for an audio-visual apparatus, comprising:

a front panel of the audio-visual apparatus;

a light-receiving lens fitted in the front panel, for receiving remote control light, the light receiving lens having a wide-angle lens surface at its input side; and

a photo-detecting element for detecting light output from the light-receiving lens, wherein said photo-detecting element receives incident light rays representing a remote control signal.

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**5,036,189**

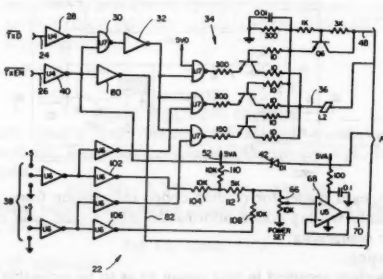
**THERMAL CONTROL FOR LASER DIODE USED IN OUTSIDE PLANT COMMUNICATIONS TERMINAL**

**William L. Geller, Foster City, Calif., assignor to Raynet Corporation, Menlo Park, Calif.**

**Filed Apr. 3, 1990, Ser. No. 504,167**

**Int. Cl.[5] G01J *1/32***

**U.S. Cl. 250—205** **32 Claims**




1. A circuit for controlling an output power level of a digital data modulated laser diode operating over a thermal gradient, said laser diode emitting optical energy at a remotely commanded optical power level periodically in a burst mode interval of a recurrent frame within a time division multiplex optical communications network, comprising:

monitoring means for monitoring a peak output optical power of the laser diode during a said burst mode interval thereof,

transimpedance amplifier means for converting a current signal from the monitoring means into a peak optical level voltage representative of sensed peak optical power during the burst mode interval,

comparator means for comparing the peak optical level voltage with a reference voltage derived in response to remotely commanded optical output level and for provid-

ing a signal representative of a logical condition from said comparison,

adjusting means for adjusting the peak optical power based on the signal and the remotely commanded optical output level.

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**5,036,190**

## METHOD AND APPARATUS FOR CANDLING ENVELOPES

**William R. Lile, Medford, N.J., and Russell M. Lange, Philadelphia, Pa., assignors to Opex Corporation, Moorestown, N.J.**

**Filed Feb. 5, 1990, Ser. No. 475,350**

**Int. Cl.[5] G01N *9/04***

**U.S. Cl. 250—223 R** **22 Claims**

1. A method for candling envelopes to determine changes in contents of said envelopes, comprising the steps of:

illuminating at least portions of said envelopes with a light source;

receiving light passing through said envelopes, and any contents thereof, at a receptor for converting said received light to an electrical signal corresponding to measured levels of light, wherein said electrical signal is nonlinear; and

linearizing said electrical signal to equalize differences in said measured levels of light corresponding to contents of said envelopes comprised of selected numbers of sheets.

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**5,036,191**

## KEY INPUT APPARATUS WITH LIGHT-SHIELDING PLATES AND LIQUID CRYSTAL SHUTTER

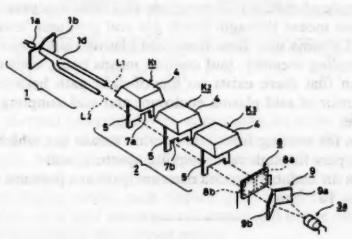
**Seiiti Senoo, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Jan. 3, 1990, Ser. No. 460,512**

**Claims priority, application Japan, Jan. 13, 1989, 1-7109; Feb. 3, 1989, 1-26041**

**Int. Cl.[5] G01D *5/34***

**U.S. Cl. 250—229** **7 Claims**



1. A key input apparatus comprising:

a light beam source for emitting a plurality of light beams,

a plurality of input keys associated with different light-shielding plates, respectively, each of said light-shielding plates intercepting a particular group of light beams including at least one of said plurality of light beams when the input key associated therewith is operated, the group of light beams intercepted by a given one of said light-shielding plates being different from groups of light beams intercepted by the other light-shielding plates,

light shutter means selectively allowing passage of said plurality of light beams, one at a time, in predetermined cycles said light shutter means includes a plurality of liquid crystal cells, electric signals being applied to said liquid crystal cells for selecting said liquid crystal cells, one at a time, in said predetermined cycles, only one selected liquid crystal cell becoming transparent for a predetermined period,

light deflector means for deflecting the light beams having passed said light shutter means to a particular point,

optical detecting means disposed at said particular point, and

circuit means for identifying intercepted groups of light beams by sampling outputs of said optical detecting means in relation to said predetermined cycles, thereby identifying operated input keys.

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**5,036,192**

## ROTARY ENCODER USING REFLECTED LIGHT

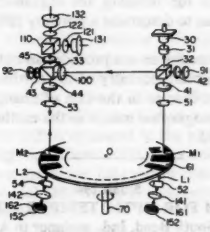
**Koh Ishizuka; Tetsuharu Nishimura, both of Kawasaki, and Osamu Kasahara, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 356,596, May 23, 1989, abandoned, which is a continuation of Ser. No. 2,229, Jan. 12, 1987, abandoned. This application Nov. 6, 1990, Ser. No. 608,629**

**Claims priority, application Japan, Jan. 14, 1986, 61-5733; Jan. 14, 1986, 61-5734; Jan. 14, 1986, 61-5736; Jan. 14, 1986, 61-5740; Jan. 14, 1986, 61-5741; Feb. 27, 1986, 61-42673**

**Int. Cl.[5] G01D *5/34***

**U.S. Cl. 250—231.16** **24 Claims**



1. An encoder arranged to detect the state of movement between a diffraction grating and a light incident on the diffraction grating, comprising:

light source means for supplying light;

splitting means for splitting the light into a plurality of beams of light;

directing means for directing the plurality of light beams onto a movable diffraction grating to be diffracted;

reflecting means for reflecting a particular order of diffracted light beams with exit from the diffraction grating and have a phase which varies with the rotation thereof, said reflecting means including a lens, having an optical axis, arranged in the light paths of said diffracted light beams and a reflecting surface disposed at a position on which said diffracted light beams are focused by said lens, and said reflecting means directing said diffracted light beams back to the position on the diffraction grating where said diffracted light beams exit so as to be re-diffracted, wherein said diffracted light beams travel along substantially the same light path as the incident light received by said reflecting means through cooperation between said lens and said reflecting surface, said reflecting means being arranged so that the light path of the particular order of diffracted light beams is substantially parallel with the optical axis of said lens; and

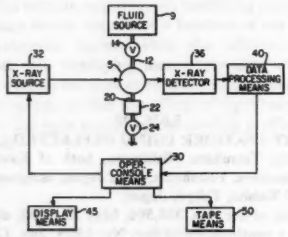
photoelectric conversion means for photoelectrically converting interference fringes formed by said re-diffracted light beams exiting from the diffraction grating and mutually interfering so as to detect the state of movement of the diffraction grating.

5,036,193

## EARTHEN CORE ANALYZING MEANS AND METHOD

Lorne A. Davis, Jr.; Timothy J. Hart; Robert M. Moss, all of Houston, and Gregory P. Pepin, Sugarland, all of Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Dec. 26, 1989, Ser. No. 457,213
Int. Cl.[5] G01N *23/06*
U.S. Cl. 250—255 6 Claims




1. An earthen core analyzing system comprising:

test cell means for containing an earthen core, an earthen core located in the test cell means,

tomographic means for testing the earthen core and providing signals corresponding thereto,

means for providing a fluid to the earthen core as part of the testing of the earthen core, and

porosity means for utilizing the signals from the tomographic means to determine a porosity of the earthen core; and

in which the porosity means provides an output corresponding to the fracture porosity of the earthen core in accordance with a change in the rate of change of the signals from the tomographic means as the earthen core is filling with the fluid.

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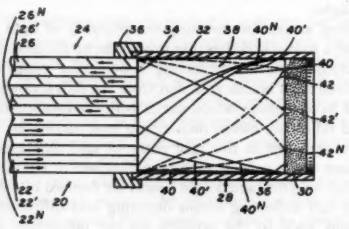
5,036,194

## LENS SYSTEM FOR OPTIC TEMPERATURE SENSOR

Barry D. Hazel, South Bend, Ind., assignor to Allied-Signal Inc., Morristown, N.J.

Filed Feb. 27, 1990, Ser. No. 485,673
Int. Cl.[5] H01J *5/16*; G01K *11/00*
U.S. Cl. 250—227.21 3 Claims




1. In an optic sensor having a bifurcated fiber bundle with a first array of fibers for communicating pulsed light form a source to illuminate a surface of a fluorescent material, said fluorescent material responding to said pulsed light by glowing to produce an output signal, said bifurcated fiber bundle having a second array of fibers for transmitting the output to a detector, the improvement comprising:

lens means for collimating pulsed light from said first array from a cone into a collimated beam to uniformly illuminate the entire surface of said fluorescent material to produce said glowing as function of the pulsed light carried by said first array and for uniformly collimating said glowing onto the second array to transmit up to one half of the total glow produced by the fluorescent material to said detector.

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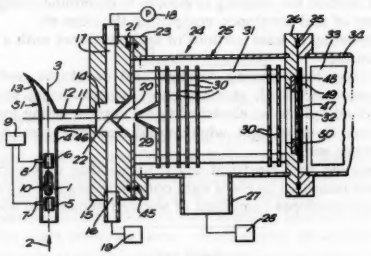
5,036,195

## GAS ANALYZER

Johnathan H. Batey, Kingsley, and Donald S. Richards, Middlewich, both of United Kingdom, assignors to VG Instruments Group Limited, Crawley, England

Filed Nov. 17, 1989, Ser. No. 438,533
Claims priority, application United Kingdom, Nov. 18, 1988, 8826966
Int. Cl.[5] H01J *49/26*
U.S. Cl. 250—288 29 Claims




1. A mass spectrometer for the analysis of a sample of matter comprised in a flow of gas, said spectrometer comprising:

a mass analyzer;

means defining a plasma enclosure;

means for causing gas comprising a said sample of matter to flow through said plasma enclosure;

means for forming a plasma in gas within said plasma enclosure;

a sampling member, said sampling member having a sampling aperture through which ions characteristic of said sample of matter may pass into said mass analyzer;

conduit means through which gas and products formed in said plasma may flow from said plasma enclosure to said sampling member, said conduit means being constructed such that there exists no line-of-sight path between the interior of said plasma enclosure and said sampling aperture;

means for venting from said conduit means gas which does not pass through said sampling aperture; and

means for maintaining said mass analyzer at a pressure of less than $10^{-3}$ torr.

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5,036,196

## SURFACE MICROSCOPE

Sumio Hosaka, Tokyo; Shigeyuki Hosoki, Hachioji, and Tsuyoshi Hasegawa, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 5, 1990, Ser. No. 533,341
Claims priority, application Japan, Jun. 9, 1989, 1-145329
Int. Cl.[5] H01J *37/00*
U.S. Cl. 250—306 23 Claims

1. A surface microscope comprising:

means for bringing a probe close to a surface of a sample to scan it therewith;

means for detecting a physical quantity generated between said probe and said sample to measure the superficial shape of said sample and to provide an information signal representing the superficial shape of said sample;

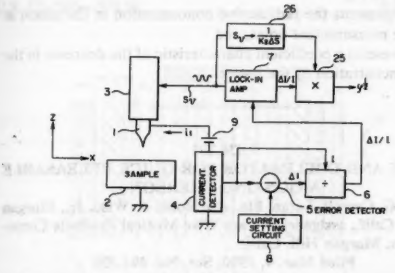
means for varying the gap between said probe and said sample;

means for detecting a variable component of said physical quantity varying, accompanied by variations in the gap by said means for varying same;

dividing means for calculating the ratio of said variable

component of said physical quantity to said physical quantity;

means for calculating tunnel barrier information, based on the quotient obtained by said dividing means; and




display means for displaying at least one of the superficial shape of the sample measured by said means for measuring the superficial shape of said sample and the tunnel barrier information calculated by said means for calculating same.

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**5,036,197**

## THERMAL IMAGING DEVICE

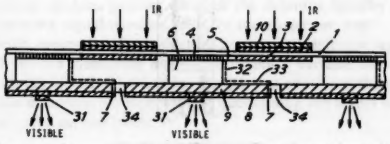
**Roger Voles, London, England, assignor to Thorn EMI Electronics Limited, Hayes, England**

**Filed Dec. 6, 1989, Ser. No. 446,534**

**Claims priority, application United Kingdom, Dec. 13, 1988, 8829035**

**Int. Cl.[5] G01J *5/20***

**U.S. Cl. 250—332** **9 Claims**




1. A thermal imaging device comprising an array of pyroelectric detector elements, means effective to transfer electrical signals between each detector element and a respective circuit means formed on a semiconducting substrate, and an array of display pixels, each display pixel being carried on a major surface of said substrate and connected to the output of a respective one of said circuit means.

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**5,036,198**

## MULTICOMPONENT PHOTOMETER

**Tilmann Spaeth, Ernatsreute, Fed. Rep. of Germany, assignor to Bodenseewerk Perkin-Elmer GmbH (BSW), Fed. Rep. of Germany**

**Filed Jun. 30, 1989, Ser. No. 374,439**

**Int. Cl.[5] G01N *21/25, 21/03***

**U.S. Cl. 250—343** **1 Claim**

1. Multicomponent photometer, comprising

(a) a light source (10) emitting a continuum and from which a measuring light beam (12) originates,

(b) a sample vessel (14) into which a sample gas can be introduced and through which the measuring light beam (12) passes,

(c) a plurality of first gas vessels (26) which are filled with different gases looked for in the sample gas,

(d) one or several second gas vessels (28), each of which is associated with at least one of the first gas vessels (26) and contains a reference gas,

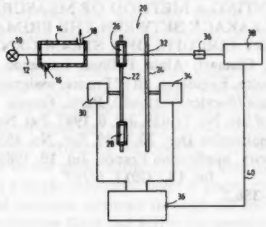
(e) one or several filters (32), each of which transmits only a limited spectral region about an absorption band of a gas contained in a first gas vessel (26) (blocking filter),

(f) a detector (36) to which the measuring light beam (12) is applied, and

(g) switching means (20) which are arranged to optionally move into the path of rays of the measuring light beam (12) a first gas vessel (26) with an associated blocking filter (32) for providing a measuring path of rays, or a second gas vessel (28) with an associated blocking filter (32) for providing a reference path of rays,

characterized in that

(h) the switching means (20) comprise sample changing means formed by a first filter wheel (22), in which the first



and the second gas vessels (26,28) are located as filters, for moving the first and the second gas vessels (26,28) into a stationary position in the path of rays of the measuring light beam (12) and filter changing means formed by a second filter wheel (24) separated therefrom for carrying the blocking filters (32) into a stationary position in the path of rays of the measuring light beam (12), and

(i) the vessel changing means (22) and the filter changing means (24) are controlled such that one and the same blocking filter (32) is arranged in the path of the rays of the measuring light beam (12) in connection with the associated first gas vessel (26) and in connection with the second gas vessel (28) which is associated with this first gas vessel (26).

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**5,036,199**

## LIQUID CRYSTAL CHOPPER AND INFRARED SENSOR

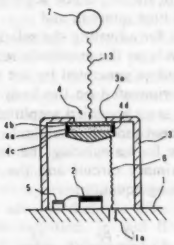
**Masakazu Sakata; Kenichi Shibata; Kousuke Takeuchi, all of Hirakata; Toshiharu Tanaka, Higashiosaka; Hiroshi Okano, Hirakata; Toshikazu Tsujino, Sakai, and Kazuhiko Kuroki, Uji, all of Japan, assignors to Sanyo Electric Co., Ltd., Moriguchi, Japan**

**Filed Feb. 20, 1990, Ser. No. 481,277**

**Claims priority, application Japan, Feb. 20, 1989, 1-18623[U]; Jul. 19, 1989, 1-187667; Jul. 20, 1989, 1-190082; Sep. 21, 1989, 1-245689; Oct. 20, 1989, 1-123391[U]**

**Int. Cl.[5] G02F *1/13***

**U.S. Cl. 250—351** **11 Claims**



1. An infrared sensor comprising:

a base;

a pyroelectric element mounted on said base.

a liquid crystal chopper disposed above said pyroelectric element, said liquid crystal chopper comprising a pair of confronting electrically conductive substrates, spacer means disposed between said conductive substrates for keeping said electrically conductive substrates spaced a predetermined distance and defining a space therebetween, and a liquid crystal enclosed in said space;

wherein one of said pair of electrically conductive substrates disposed nearest said pyroelectric element is grounded.

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**5,036,200**

## DEVICE FOR COUNTING PARTICLES OF IONIZING RADIATION AND ITS APPLICATION TO IMPLEMENTING A METHOD OF MEASURING THE RATE OF LEAKAGE BETWEEN THE PRIMARY AND SECONDARY CIRCUITS OF A STEAM GENERATOR

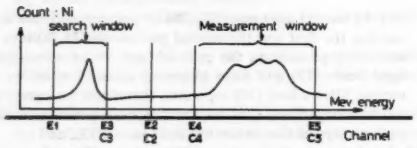
**Alain Dubail, Clamart; Alain Pailhes, Lamanon Senas, and Francis Schulcz, Eyguieres, all of France, assignors to Electricite de France (Service National), Paris, France**

**Continuation of Ser. No. 71,025, Jul. 8, 1987, Pat. No. 4,918,313. This application Dec. 20, 1989, Ser. No. 453,595**

**Claims priority, application France, Jul. 10, 1986, 86 10088**

**Int. Cl.[5] G01T *1/167***

**U.S. Cl. 250—356.2** **11 Claims**




1. A device for measuring in real time the flowrate of fluid between a primary circuit and a secondary circuit of a steam generator, powered by a reactor of a nuclear power plant, said device comprising:

detecting means for detecting at a specified point at the exterior of the secondary circuit a radioactive tracer, said detecting means comprising:

a device for counting particles of ionizing radiation of specified energy levels, said counting device comprising radiation detecting means for detecting said radiation and delivering a detection signal in pulse form,

a reference source on the input side of said radiation detecting means, said reference source delivering reference ionizing radiation the energy spectrum of which is situated outside the energy spectrum of said ionizing radiation,

discrimination means on the output side of said radiation detecting means for discriminating the amplitude of said detection signal against a scale of amplitude levels and discriminating the energy spectrum of the received ionizing radiation which generated said pulses by counting the number of pulses of specified amplitude relative to the levels of the amplitude scale generated during a measurement time interval, and

adjusting means for adjusting the relative position of the amplitude levels on the amplitude scale and the amplitude of the pulses generated by the reference ionizing radiation discriminated on the basis of the number of pulses of the same specified amplitude counted during the measurement time interval, and

calculating means for calculating the leakage flowrate q between the primary circuit and the secondary circuit from the following equation:

$$q = \frac{-Q \cdot \rho p}{\rho v} \cdot k \cdot \frac{Ap}{A_v}$$

in which:

$\rho p$ represents the density of the primary fluid,

Ap represents the radioactive concentration in the primary fluid at the leak,

Q represents the stem flowrate, $\rho v$ represents the density of the steam,

$A_v$ represents the radioactive concentration in the steam at the measurement point, and

k represents a coefficient characteristic of the decrease in the concentration of the tracer.

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**5,036,201**

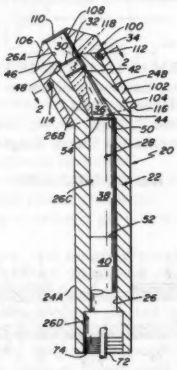
## PROBE AND COLLIMATOR FOR QUICK RELEASABLE MOUNTING THEREON

**Robert G. Carroll, Largo, Fla., and Robin A. Wise, Jr., Morgan Hill, Calif., assignors to Care Wise Medical Products Corporation, Morgan Hill, Calif.**

**Filed Mar. 9, 1990, Ser. No. 491,390**

**Int. Cl.[5] G01T *1/161***

**U.S. Cl. 250—363.10** **29 Claims**

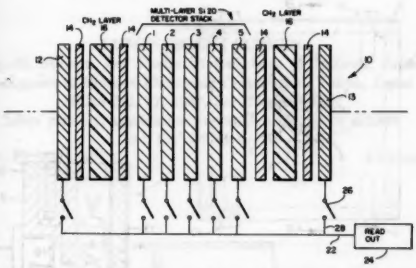



1. A probe and collimator for ready releasable mounting thereon, said probe being arranged for detecting radiation emanating from a hidden source when held adjacent said hidden source, said probe comprising a probe body formed of a radiation blocking material, radiation detecting means located within said probe body, and a first radiation transparent, closed window located at the distal end of said probe body and confronting said detecting means through which radiation may pass in a first solid angle of acceptance, said collimator being arranged when releasably mounted on said probe to decrease said first solid angle of acceptance of radiation through said first window to said detecting means, said collimator comprising a cylindrical member formed of a radiation blocking material having a cylindrical bore extending therethrough and into which said distal end of said probe body is arranged to be inserted, said bore including an air vent in communication with the ambient atmosphere, at least one holding means located at a fixed position in the inner periphery of said bore, and a resilient locking member held by said holding means thereat, said bore also having a distal end at which a second radiation transparent, closed window is located, said probe including at least one recess extending about the outer periphery thereof adjacent the distal end thereof for receipt of said locking member to releasably secure said collimator to said probe when said distal end of said probe body is inserted into said bore in said collimator, with said air vent enabling air trapped between said distal end of the probe body and said collimator to vent to the ambient atmosphere.

## 5,036,202
## BI-DIRECTIONAL NEUTRON DETECTOR

Robert L. Schulte, Port Washington, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Apr. 24, 1990, Ser. No. 513,978
Int. Cl.[5] G01T 3/08
U.S. Cl. 250—370.05 9 Claims




5. A bi-directional neutron detector having a plurality of repetitive segments, each segment comprising:

means for freeing recoiling protons upon incidence of neutrons, having two separated layers of hydrogenous material;

a plurality of silicon layers interposed between the hydrogenous layers, through which the recoil protons pass with increasing loss of energy;

means for individually measuring the energy loss of recoil protons in each silicon layer for establishing energy loss patterns indicative of proton path direction;

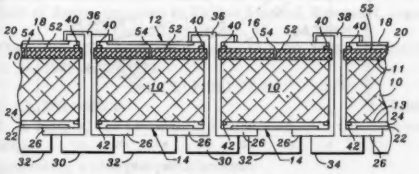
means located between at least one of the hydrogenous layers and the silicon layers for absorbing low energy recoil protons passing through the detector thereby improving signal-to-noise ratio for measurement; and

switch means for disconnecting preselected detector layers from the measuring means producing a variable neutron energy threshold whereby energy loss continues through the disconnected layers while maintaining the layers inactive for measurement.

## 5,036,203
## SUPERIMPOSED DETECTOR ARRAYS HAVING OPTICAL FILTERS

Allen L. Solomon, Fullerton, Calif., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Dec. 20, 1989, Ser. No. 454,035
Int. Cl.[5] H01L 49/02
U.S. Cl. 250—370.06 8 Claims



1. An infrared detector array simultaneously having two separate spectral responses, for communicating signals representative of infrared radiation detected in two separate ranges of wavelengths to processing circuitry, the array comprising:

(a) a common substrate having first and second substantially parallel planar surfaces;

(b) at least one filter element disposed upon at least one of said first and second planar surfaces of said substrate for attenuating infrared radiation outside the second range of wavelengths prior to its being sensed by said second detector elements;

(c) a plurality of first detector elements disposed generally adjacent the first planar surface of said common substrate for detecting infrared radiation in a first range of wavelengths, said first detectors being formed upon one of said at least one filter element and said substrate; and

(d) a plurality of second detector elements, the number of second detector elements substantially conforming to the number of first detector elements, the second detector elements disposed generally adjacent the second planar surface of said common substrate for detecting radiation in a second range of wavelengths, said second detectors being formed upon one of said filter element and said common substrate, said second detector elements receiving infrared radiation after the infrared radiation has passed through said first detectors and said common substrate;

(e) wherein said at least one filter element comprises an interference filter having at least one aperture formed therein, said interference filter formed intermediate said first detector elements and said second detector elements, the aperture providing an opening from said common substrate to the upper surface of said interference filter;

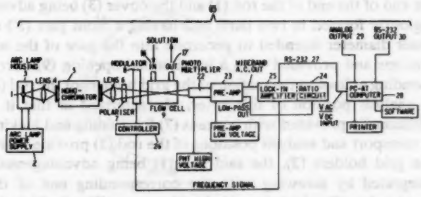
(f) wherein a single crystalline layer is graphotaxially grown from said common substrate through the aperture in each said interference filter and across the surface of each said interference filter, said single crystalline layer suitable for the formation of detector elements; and

(g) wherein signals representative of the infrared radiation detected by the first detector elements is communicated to processing circuitry and signals representative of the infrared radiation detected by the second detector elements is also communicated to processing circuitry.

## 5,036,204
## CONTINUOUS CONCENTRATION MONITORING BY CIRCULAR DICHROISM

Donald E. Leyden, Chester, Va., assignor to Philip Morris, Inc., New York, N.Y.

Filed Jul. 24, 1989, Ser. No. 383,717
Int. Cl.[5] G01N 21/21
U.S. Cl. 250—373 13 Claims




1. An apparatus for continuously monitoring the concentration of a subject compound in a flowing solution, comprising:

means for generating a beam of alternately left circularly polarized and right circularly polarized monochromatic electromagnetic radiation directed along a path;

a flow cell positioned down said path from the means for generating and having first and second separate straight channels therethrough which intersect at a single point, the first channel being arranged so the flowing solution passed therethrough and the second channel being arranged so that the beam of electromagnetic radiation passes therethrough;

first and second transparent plates, comprised of a material which has no adverse dichroic effects on the beam of electromagnetic radiation, in said flow cell positioned relative to each other and to said channels so that said beam of electromagnetic radiation traverses said first plate, then said flowing solution, and then said second

transparent plate before exiting the flow cell, the first and second transparent plates being located to isolate said first channel from said second channel;

means for continuously detecting the intensity of said beam of electromagnetic radiation after passage through the flowing solution in said flow cell and converting the intensity measure into an electronic signal comprising a direct current component and an alternating current component;

means for continuously determining the concentration of the subject compound in the flowing solution by measuring a ratio of the direct current component to the alternating current component to the alternating current component.

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**5,036,205**

## APPARATUS FOR THE TRANSFER AND IN-SITU REACTIONS UNDER A CONTROLLED ATMOSPHERE, OF SPECIMENS FOR TRANSMISSIVE ELECTRON MICROSCOPY

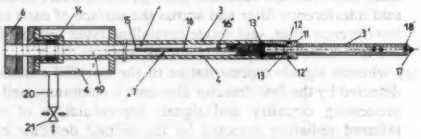
**José Clement, Chambrey, and Daniel Guerard, Malzeville, both of France, assignors to Chaixmeca Sarl, Maxeville, France**

**Filed Nov. 17, 1989, Ser. No. 437,804**

**Claims priority, application France, Nov. 18, 1988, 88 15221**

**Int. Cl.[5] G21K *5/10***

**U.S. Cl. 250—442.1** **6 Claims**



1. Device for the transfer and in-situ reactions under a controlled atmosphere, of specimens for transmissive electron microscopy, essentially constituted by a cylindrical rod (1) of slight diameter comprising, near one end, two grid holders (2) and slidably mounted in a cover (3) of greater diameter provided with a sealed chamber (4) for housing the grid holders (2) in transport position, by a traction bar (5) integrated with the end of the rod (1) of slight diameter opposite the grid holders (2), guided in the cover (3) of greater diameter and provided at its other end with a manipulating button (6), the grid holders (2) being advantageously arranged in a flat (8) of the end of the end of the rod (1) and the cover (3) being advantagiously formed in two parts and having a front part (3') of lesser diameter intended to penetrate into the gate of the microcope and provided with a longitudinal opening (9) corresponding at least to the section of the grid holders of the rod (1) in analysis position of this latter, characterized in that it is additionally provided with a means (7) for guiding and locking in transport and analysis positions of the rod (1) provided with the grid holders (2), the said rod (1) being advantageously integrated by screwing with the corresponding end of the traction bar (5) which is guided in the cover (3), of which the opening (9) of the front part (3') of lesser diameter is extended over a portion of the length of this front part (3'), on both sides, by longitudinal grooves (10), the said front part (3') being connected to the rest of the cover (3) by screwing of a shouldered portion (11), a gasket (13') effecting sealing at the level of the screwed assembly.

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**5,036,206**

## COMBINED LASER POSITION DETECTOR, INFRARED EMISSIVITY TARGET AND TV TARGET

**Jack D. Frank, Long Beach, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Feb. 12, 1990, Ser. No. 479,024**

**Int. Cl.[5] G01B *11/26;* F21K *2/00***

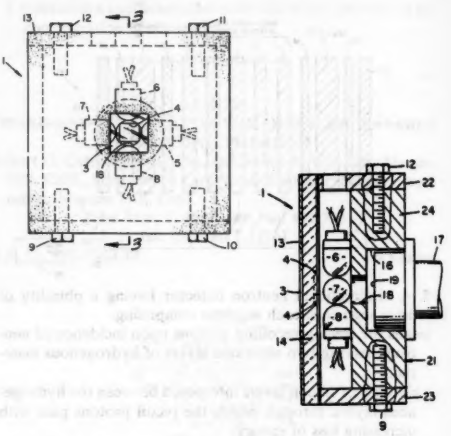
**U.S. Cl. 250—467.1** **6 Claims**

1. A combined laser position detector, infrared target and TV target comprising:

housing means;

a light transparent substrate having an infrared target on a first side of said substrate and a TV target on an opposing second side of said substrate, said TV target and said infrared target being in registration with one another, said substrate being affixed to said housing means;

light-emitting means in said housing and behind said substrate for directing emitted light through said TV target and through said infrared target and for heating said infrared target; and



laser position detector means positioned behind said light-emitting means and in alignment with said TV target and infrared target for receiving laser light passing through said TV target and through said infrared target.

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**5,036,207**

## RADIATION IMAGE STORAGE PANEL

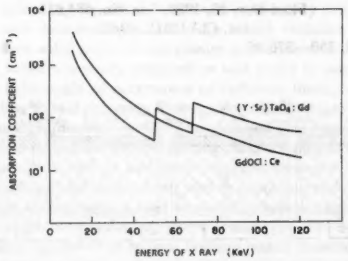
**Takashi Nakamura, and Yasushi Kojima, both of Kaisei, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Dec. 22, 1989, Ser. No. 455,249**

**Claims priority, application Japan, Dec. 28, 1988, 63-333852**

**Int. Cl.[5] G03B *42/00***

**U.S. Cl. 250—484.1** **8 Claims**




1. A radiation image storage panel having a phosphor layer, including a stimulable cerium activated rare earth oxyhalide phosphor which has the following formula (I):

*LnOX:xCe*

in which Ln is at least one rare earth element selected from the group consisting Y, La, Gd and Lu: and x is at least one halogen selected from the group consisting Cl, Br, and I; and x is a

number satisfying the condition of $0<x\leqq 0.2$, which absorbs both a radiation in a wavelength shorter than 250 nm and ultraviolet rays in a wavelength of 250–400 nm, then which stores their energies, and which emits the energies as luminescence when it is exposed to irradiation of a visible light or an infrared ray; and also including a phosphor which emits ultraviolet rays in a wavelength of 250–400 nm when it is excited by a radiation in a wavelength shorter than 250 nm.

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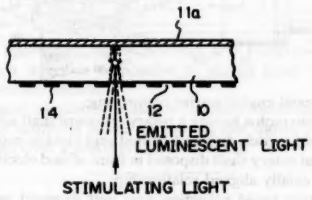
**5,036,208**

## LUMINESCENT SCREEN

**Yasushi Murata, and Fumio Matsui, both of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan**

**Filed Jul. 17, 1989, Ser. No. 380,493**
**Claims priority, application Japan, Jan. 17, 1989, 1-8388**
**Int. Cl.[5] G03B *42/00***
**U.S. Cl. 250—487.1** **3 Claims**




1. A luminescent screen comprising:

a screen plate having front and rear faces, light being projected through said front face of said screen plate;

luminescent material being contained in said screen plate between said front and rear faces and responsive to said light projected through said front face to emit luminescent light;

a layer of reflective material being disposed on said rear face of said screen plate for reflecting said luminescent light outward through said front face of said screen plate; and

a layer of light absorbing material being disposed on said front face of said screen plate, said layer of light absorbing material being disposed so as to cover the front face of said screen plate at spaced intervals, a spacing being provided between adjacent covered regions on said front face corresponding to a spacing of pixel regions defined by light projected through the front face of said screen plate.

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**5,036,209**

## FABRICATION METHOD FOR SEMICONDUCTOR DEVICES AND TRANSPARENT MASK FOR CHARGED PARTICLE BEAM

**Toyotaka Katsoka, Hamamatsu, and Kiichi Sakamoto, Tokyo, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Oct. 20, 1989, Ser. No. 424,733**
**Claims priority, application Japan, Oct. 20, 1988, 63-264617; Oct. 24, 1988, 63-267522**
**Int. Cl.[5] H01J *37/04***
**U.S. Cl. 250—492.2** **7 Claims**

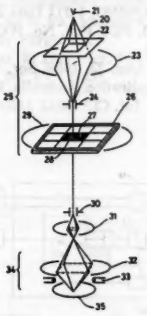
1. A method for fabricating a semiconductor device comprising:

generating a charged particle beam;

providing a mask having a multiplicity of individual discrete areas, each having at least one transparent aperture, said individual areas being arranged on said mask in a number of pattern forming regions, with each region comprising a plurality of said individual areas;

moving said mask mechanically to place a selected one of said regions at an electron beam illumination position;

deflecting the charged particle beam to illuminate a single individual area of the selected region whereby the beam is patterned by the apertures of said single individual area; and




reducing the patterned beam and projecting the reduced, patterned beam onto an object to be exposed.

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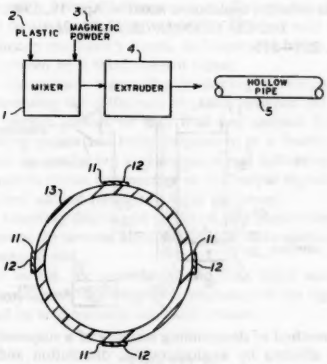
**5,036,210**

## MAGNETICALLY DETECTABLE PLASTIC PIPE

**William L. Goodman, Mountain View, Calif., assignor to Gas Research Institute, Chicago, Ill.**

**Division of Ser. No. 452,195, Dec. 18, 1989. This application Jul. 16, 1990, Ser. No. 553,239**
**Int. Cl.[5] G06K *19/06*; F16L *55/00, 11/12***
**U.S. Cl. 235—493** **17 Claims**




1. A method of producing magnetically detectable plastic pipe for underground use, comprising;

providing an organic plastic for extrusion,

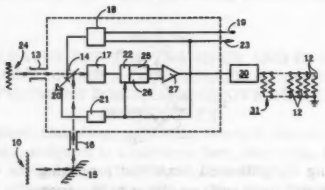
providing particles of magnetic material comprising electrically-nonconductive, highly-magnetizable iron oxide or barium ferrite,

mixing said particles of electrically-nonconductive, highly-magnetizable iron oxide or barium ferrite uniformly with said organic plastic, heating and extruding said mixture of organic plastic and electrically-nonconductive, highly-magnetizable iron oxide or barium ferrite and highly magnetizing said particles to produce a hollow tubular pipe having said highly magnetized particles distributed and proportioned such that the plastic pipe may be easily detected by magnetic detection apparatus on the surface when the plastic pipe is buried at three to five feet or more under the ground.

## 5,036,211
## INFRARED SIGNATURE CONTROL MECHANISM

Owen S. Scott, Salisbury, Australia, assignor to The Commonwealth of Australia, Canberra, Australia

PCT No. PCT/AU88/00487, § 371 Date Jun. 21, 1990, § 102(e) Date Jun. 21, 1990, PCT Pub. No. WO89/06338, PCT Pub. Date Jul. 13, 1989
PCT Filed Dec. 23, 1988, Ser. No. 477,940
Claims priority, application Australia, Dec. 23, 1988, PI6149
Int. Cl.[5] G01J *1/00*
U.S. Cl. 250—495.1 11 Claims

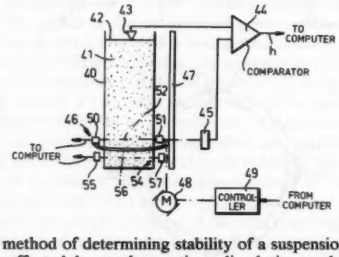


1. A means for reflecting and emitting electro-magnetic energy in an appropriate wavelength band comprising an arrangement of surfaces which are reflective to energy in that wavelength band and energy emitters having an emission of energy of such intensity that the combined reflection and emission of said surfaces match energy of a background in that wavelength band.

## 5,036,212
## METHOD OF AND APPARATUS FOR ANALYZING A SUSPENSION IN A CUVETTE

Gernot Staudinger, Messendorfberg 99, A-8042 Graz, Austria

Filed Apr. 17, 1990, Ser. No. 513,287
Claims priority, application Austria, Apr. 18, 1989, 926/89
Int. Cl.[5] G01N *15/06, 23/06, 21/01*
U.S. Cl. 250—575 8 Claims




1. A method of determining stability of a suspension which can be affected by agglomeration, dissolution and thermal movement of particles of the suspension, comprising the steps of:

(a) introducing said suspension into a cuvette transmissive to a radiation capable of obstruction by said particles;

(b) scanning said suspension in said cuvette over a height h thereof as measured from a top of said suspension in said cuvette and a time t measured from the start of the sedimentation of said particles in said suspension in said cuvette with a beam of said radiation and simultaneously measuring radiation of said beam transmitted through said suspension to establish first measured values of radiation extinction or transmission corresponding to various ratios h/t;

(c) separately measuring at least one further value of extinction or transmission at least at one corresponding ratio h/t;

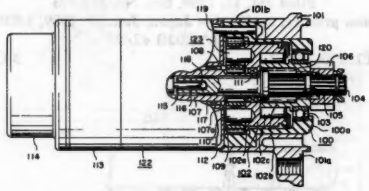
(d) comparing a first measured value at a given ratio h/t from step (b) with said further value at said given ratio h/t in step (c); and

(e) relating a quotient resulting from comparison in step (d) of said first measured value at said given ratio h/t from step (b) and said further value at said given ratio from step (c) to said stability of said suspension.

## 5,036,213
## COAXIAL ENGINE STARTER

Shuzoo Isozumi, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 20, 1990, Ser. No. 481,259
Claims priority, application Japan, Feb. 20, 1989, 1-40634
Int. Cl.[5] F02N *11/00*
U.S. Cl. 290—48 4 Claims



1. A coaxial engine starter comprising:

an electric motor having a rotary armature shaft and a yoke;

a solenoid switch disposed behind said electric motor;

an output rotary shaft disposed in front of said electric motor in an axially aligned relationship;

a planetary speed reduction gear unit disposed in front of and in axial alignment with said electric motor, said planetary speed reduction gear unit having a metal sun gear disposed on said motor armature shaft, a plurality of metal planetary gears disposed around said sun gear, and a stationary inner gear made of a resinous material disposed around said planetary gears;

a pinion gear mounted on said output rotary shaft for rotation therewith and for engaging with an engine ring gear to be driven;

a hollow inner housing made of a resinous material, said inner housing having an axial opening at an outermost end thereof through which said output rotary shaft extends, said inner housing rotatably supporting said output rotary shaft via bearing means disposed in said opening, and having integrally formed in an innermost end thereof said stationary inner gear of said planetary speed reduction gear unit; and

a generally cylindrical, metallic outer housing disposed surrounding said resinous inner housing and having a mounting flange for mounting said coaxial engine starter to the engine, said outer housing being in direct electrical contact with said motor yoke.

## 5,036,214
## REMOTE CONTROL SWITCH FOR CONTROLLING TWO ELECTRIC SUPPLIES

Michael A. Zerillo, 4143 Elizabeth La., Annandale, Va. 22003

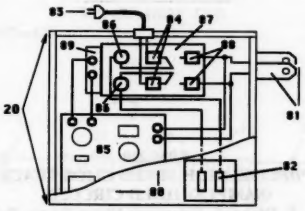
Division of Ser. No. 413,283, Sep. 27, 1989, Pat. No. 4,958,112.
This application May 31, 1990, Ser. No. 531,340
Int. Cl.[5] H01H *3/28, 9/54*
U.S. Cl. 307—140 8 Claims

1. A mechanism for controlling electricity from a first electric supply and for optionally and simultaneously controlling electricity from a second electric supply, wherein said mechanism comprises receiver-controlled switch means and circuit means for providing and terminating said electricity to outlet means of said mechanism, said mechanism is useful as an actuation means of electrical apparatus plugged-in to said outlet means, said mechanism further comprising:

first conductor means having first plug means for connecting said receiver-controlled switch means to said first electric

supply whereas said first electric supply is a non-interruptible electric supply;

second conductor means having second plug means for optionally and simultaneously connecting said receiver-controlled switch means to said second electric supply whereas said electric supply is an interruptible electric supply;




signal transmitter means whereas said receiver-controlled switch means is responsive to signals from said signal transmitter means;

said signal transmitter means is remotely locatable and comprises actuating means for causing said signals to be transmitted over a predetermined distance.

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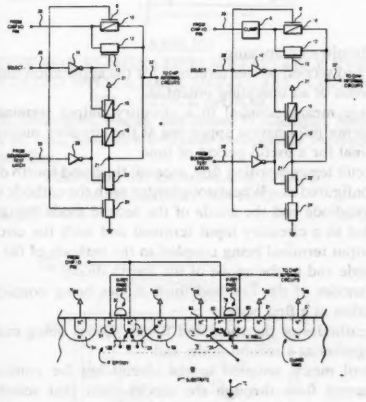
**5,036,215**

## PASS GATE MULTIPLEXER RECEIVER CIRCUIT

**Robert P. Masleid, and Robert F. Sechler, both of Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jan. 29, 1990, Ser. No. 471,893**
**Int. Cl.[5] H03K** *17/16, 17/687, 17/08, 3/073*
**U.S. Cl. 307—243** **18 Claims**



1. A pass gate multiplexer receiver integrated circuit on a semiconductor substrate comprising:

a pass gate means including first and second field effect transistors of opposite polarity for providing an input signal to an output line, said first transistor including a first bipolar transistor means for providing clamping and electrostatic discharge protection and including a guard ring region and said second transistor including a second bipolar transistor means for providing clamping and electrostatic discharge protection; and

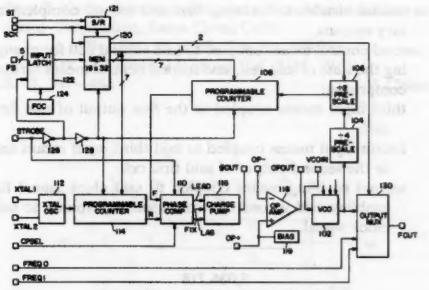
a control means for controlling pass gate means operation.

**5,036,216**

## VIDEO DOT CLOCK GENERATOR

**Jere W. Hohmann, Doylestown; Bruce J. Rogers, Collegeville; Stephen A. Ransom, Huntingdon Valley, and Daniel M. Clementi, Doylestown, all of Pa., assignors to Integrated Circuit Systems, Inc., Valley Forge, Pa.**

**Filed Mar. 8, 1990, Ser. No. 490,784**
**Int. Cl.[5] H03L** *7/8*
**U.S. Cl. 309—269** **15 Claims**




1. Apparatus for use in generating multiple clock signals, comprising:

a source of reference oscillatory signal;

first frequency dividing means for dividing said reference oscillatory signal in frequency by an amount determined by a first control signal;

variable oscillator means having a control input terminal and responsive to a second control signal applied thereto for generating a variable frequency oscillatory signal;

second frequency dividing means for dividing said variable frequency oscillatory signal, in frequency, by an amount determined by a third control signal;

phase comparison means for producing an output signal representing the difference in phase between the respective output signals of said first and second frequency dividing means and being responsive to a fourth control signal for producing said output signal indicating no difference in phase, irrespective of the output signals of said first and second frequency dividing means;

means coupling the output signal of said phase comparison means to the control input terminal of said variable oscillator means; and

control means, for generating said first, third and fourth control signals to change the frequency of the signal provided by said variable oscillator means.

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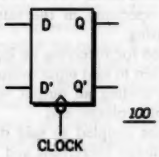
**5,036,217**

## HIGH-SPEED LOW-POWER FLIP-FLOP

**Norman T. Rollins, Plantation, Fla., and Gianfranco Gerosa, Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Jun. 2, 1989, Ser. No. 360,819**
**Int. Cl.[5] H03K** *3/284, 3/289*
**U.S. Cl. 307—272.2** **36 Claims**




1. A flip-flop comprising:

a first dynamic bistable cell having first and second complementary outputs;

first control means coupled to said first cell for changing the state of said first cell, said first control means further comprising:

first input means for receiving data;

second input means, coupled to said first input means and coupled to receive the complement of said data; and

first enabling means coupled to receive a clock signal for enabling said first control means in response to said clock signal;

a second bistable cell having first and second complementary outputs;

second control means coupled to said second cell for changing the state of said cell, said second control means further comprising:

third input means coupled to the first output of said first cell;

fourth input means coupled to said third input means and to the second output of said first cell;

second enabling means coupled to said clock signal for enabling said second control means in response to said clock signal.

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**5,036,218**

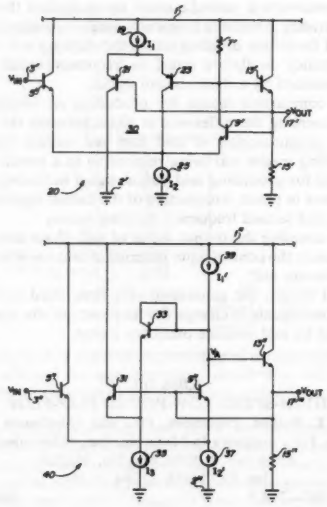
**ANTISATURATION CIRCUIT**

**Glen A. Jaquette, Tucson, Ariz., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Mar. 21, 1990, Ser. No. 496,752**

**Int. Cl.[5] H03K *17/60***

**U.S. Cl. 307—300** **14 Claims**



7. A high performance buffer circuit having a driver transistor protected from operating in the saturation mode, said buffer circuit comprising:

input means coupled for receiving an input voltage;

output means coupled to said input means and to said driver transistor for providing an output voltage substantially equal to said input voltage; and

antisaturation means coupled to said driver transistor for monitoring a voltage therefrom and when said voltage reaches a predetermined magnitude, reducing a collector current in said driver transistor without substantially affecting a base current in said driver transistor before said driver transistor can operate in the saturation mode.

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**5,036,219**

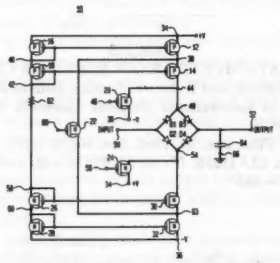
**PRECISE, HIGH SPEED CMOS TRACK (SAMPLE)/HOLD CIRCUITS**

**Andrew G. F. Dingwall, Princeton; Victor Zazzu, Belle Mead, and Harry G. Erhardt, Lawrenceville, all of N.J., assignors to Harris Corporation, Melbourne, Fla.**

**Filed May 31, 1989, Ser. No. 359,176**

**Int. Cl.[5] G11C *27/02***

**U.S. Cl. 307—353** **29 Claims**



1. Circuitry comprising:

first and second power terminals for the application therebetween of an operating potential;

storage means coupled to a circuitry output terminal for storing information appearing at the circuitry output terminal for a useful period of time;

a circuit leg comprising first, second, third and fourth diodes configured as a Wheatstone bridge with the cathode of the first diode and the anode of the second diode being coupled to a circuitry input terminal and with the circuitry output terminal being coupled to the cathode of the third diode and to the anode of the fourth diode;

the anodes of the first and third diodes being coupled together at a first node;

the cathodes of the third and fourth diodes being coupled together at a second node; and

control means coupled to the circuit leg for controlling current flow through the diodes such that selectively current can be diverted away from the diodes, said control means comprising first, second, third and fourth transistors, each transistor having first and second electrodes defining the ends of a conduction path, and a control electrode for controlling the conductivity of the transistor;

means coupling the conduction paths of said first and second transistors in series between said first node and said first power terminal; and

means coupling the conduction paths of said third and fourth transistors in series between said second node and said second power terminal.

5,036,220

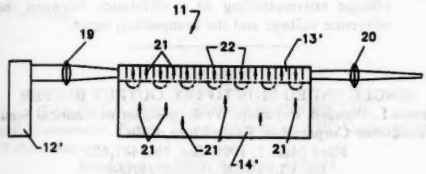
## NONLINEAR OPTICAL RADIATION GENERATOR AND METHOD OF CONTROLLING REGIONS OF FERROELECTRIC POLARIZATION DOMAINS IN SOLID STATE BODIES

Robert L. Byer, Stanford; Martin M. Fejer, and Eric J. Lim, both of Menlo Park, all of Calif., assignors to Leland Stanford Junior University, Stanford, Calif.

Division of Ser. No. 305,215, Feb. 1, 1989. This application Apr. 20, 1990, Ser. No. 511,547

Int. Cl.[5] H03F 7/00

U.S. Cl. 307—427 7 Claims




1. A nonlinear converter of electromagnetic radiation having a desired optical frequency, comprising:

a body of solid state material;

source means of electromagnetic radiation having one or more frequencies which are different than the desired optical frequency;

waveguide means provided by said body for confining electromagnetic radiation;

means for directing electromagnetic radiation from said source means into said waveguide means; and

said waveguide means having a plurality of succeeding regions of differing compositions respectively providing differing states of dominant electrical polarization in succeeding regions transverse to the path of radiation guided by the same for converting radiation from said source means to output radiation having said desired optical frequency.

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5,036,221

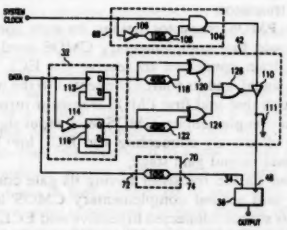
## CIRCUIT FOR ELIMINATING METASTABLE EVENTS ASSOCIATED WITH A DATA SIGNAL ASYNCHRONOUS TO A CLOCK SIGNAL

Louis S. Brucculeri, Dallas, and James N. Giddings, Mesquite, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 31, 1989, Ser. No. 331,477

Int. Cl.[5] H03K 5/13, 19/00

U.S. Cl. 307—443 16 Claims




1. A circuit for reducing the metastable events in a clocked circuit produced by a data signal asynchronous with respect to a system clock signal input to the clocked circuit, comprising:

a data line coupled to the clocked circuit for inputting a data signal;

an edge detecting circuit coupled to the data line for detecting a transition in the data signal;

a system clock for generating a system clock signal; and

a disabling circuit coupled to the system clock, the edge detecting circuit and the clocked circuit for disabling the system clock signal from the clocked circuit for a predetermined time period following detection of said transition of the data signal.

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5,036,222

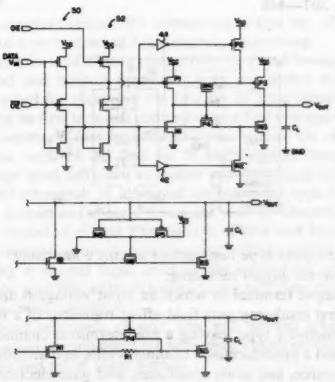
## OUTPUT BUFFER CIRCUIT WITH OUTPUT VOLTAGE SENSING FOR REDUCING SWITCHING INDUCED NOISE

Jeffrey B. Davis, Raymond, Me., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Feb. 22, 1990, Ser. No. 483,931

Int. Cl.[5] H03K 17/16, 19/094, 5/12, 19/017

U.S. Cl. 307—443 25 Claims



1. An output buffer for reducing switching induced noise in high speed integrated circuit devices, said output buffer having an input for receiving data signals of logic high and low potential levels, an output for delivering data signals propagated through the output buffer, a relatively large current carrying capacity primary pulldown transistor element operatively coupled at the output for sinking a relatively large discharge current from the output to ground, and a relatively large current carrying capacity primary pullup transistor element operatively coupled at the output for sourcing a relatively large charging current to the output from a power supply, each transistor element being characterized by a sourcing or sinking current path between first and second terminal leads, and a third control terminal lead for controlling the conducting state of the current path, the improvement comprising:

a relatively small current carrying capacity secondary pulldown transistor element having its current path first and second terminal leads coupled in parallel with the current path first and second terminal leads of the primary pulldown transistor element;

and a first output voltage sensing active switching circuit coupled in series between the control terminal leads of the secondary and primary pulldown transistor elements, said first output voltage sensing active switching circuit switching between different conducting states in response to the voltage level at the output for controlling the conducting state of the primary pulldown transistor element;

said secondary pulldown transistor element control terminal lead being coupled in the output buffer to receive a signal propagating through the output buffer before the primary pulldown transistor element control terminal lead to initiate a relatively small discharge current from the output before turn on of the relatively large discharge current of

the primary pulldown transistor element by the first output voltage sensing active switching circuit;

said first output voltage sensing active switching circuit also being coupled to the output and being responsive to the output voltage level for turning on the primary pulldown transistor element during transition from logic high to low potential levels at the output at a selected first threshold voltage level below said logic high potential level.

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**5,036,223**

**INVERTER CIRCUIT AND CHOPPER TYPE COMPARATOR CIRCUIT USING THE SAME**

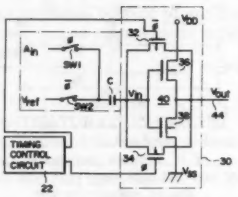
**Hideo Sakai, Yokohama; Kiyoharu Oikawa, Kawasaki, and Tomotaka Saito, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed May 18, 1990, Ser. No. 525,041**

**Claims priority, application Japan, May 22, 1989, 1-128302**

**Int. Cl.[5] H03K** *5/24, 17/04*

**U.S. Cl. 307—448** **7 Claims**




2. A chopper type comparator circuit comprising:

an inverter circuit including:

an input terminal to which an input voltage is applied,

a first insulating gate field effect transistor of a first conductivity type, having a predetermined channel length and a predetermined channel width, and including gate, source, and drain electrodes, said gate electrode being connected to said input terminal,

a second insulating gate field effect transistor of a second conductivity, having a predetermined channel length and a predetermined channel width, and including gate, source, and drain electrodes, said gate and drain electrodes of said second insulating gate field effect transistor being respectively connected to said gate and drain electrodes of said first insulating gate field effect transistor, and said gate electrode of said second transistor being connected to said input terminal,

a first wiring resistor connected to the source electrode of said first insulating gate field effect transistor and having a predetermined resistance,

a second wiring resistor connected to the source electrode of said second insulating gate field effect transistor and having a predetermined resistance,

first power source means connected to said first wiring resistor,

second power source means different from said first power source means connected to said second wiring resistor, and

an output terminal, connected to the drains of said first and second insulating gate field effect transistors, for outputting a voltage,

wherein, assuming that the channel length and width of said first insulating gate field effect transistor are $L_N$ and $W_N$, respectively, the resistance of said first wiring resister is $R_S$, the channel length and width of said second insulating gate field effect transistor are $L_p$ and $W_p$, respectively, the resistance of said second wiring resister is $R_D$, and the carrier mobilities of said first and second insulating gate field effect transistors are $\mu$N and $\mu$P, respectively, a relation represented by:

$$\frac{R_S}{R_D} = \sqrt{\left(\frac{W_P}{L_P} / \frac{W_N}{L_N}\right) \cdot \frac{\mu_P}{\mu_N}}$$

is approximately satisfied,

self-bias switching means, connected between said input terminal and said output terminal, for opening/closing a path between the input and output terminals in accordance with sampling of a comparison input and comparison between the comparison input and a reference voltage,

the input terminal of said inverter circuit receiving a voltage corresponding to a difference between the reference voltage and the comparison input.

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**5,036,224**

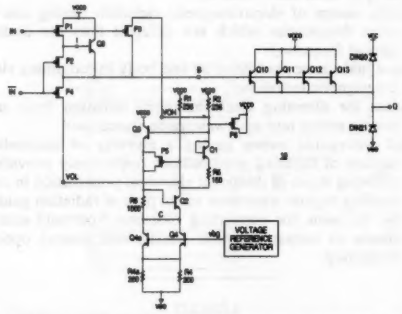
**SINGLE ENDED MOS TO ECL OUTPUT BUFFER**

**Dennis L. Wendell, Puyallup, Wash., assignor to National Semiconductor Corporation, Santa Clara, Calif.**

**Filed Mar. 1, 1990, Ser. No. 487,453**

**Int. Cl.[5] H03K** *19/092, 19/094*

**U.S. Cl. 307—475** **1 Claim**




1. An output buffer circuit for converting first and second complementary CMOS level input signals to an ECL level output signal, the circuit comprising:

(a) first ECL means for generating an ECL high voltage level signal;

(b) second ECL means for generating an ECL low voltage level signal;

(c) an output gain stage responsive to the output of the switching means for providing gain to the ECL level output signal;

(d) a npn transistor;

(e) a first PMOS transistor having its gate connected to receive said first complementary CMOS level input signal, its drain connected to receive the ECL low level voltage signal, and its source connected to the output gain stage, such that said first PMOS transistor turns on when said first complementary CMOS level input signal is low, thereby effectively connecting said ECL low level voltage to said output gain stage;

(f) a second PMOS transistor having its gate connected to receive said second complementary CMOS level input signal, its source connected to receive said ECL high level voltage, and its drain connected to the output gain stage, such that said second PMOS transistor turns on when said second complementary CMOS level input signal goes low thereby effectively connecting said ECL high level voltage to said output gain stage;

(g) a third PMOS transistor having its gate connected to receive said first complementary CMOS level input signal, its drain connected to the output gain stage, and its

source connected to the base of said npn transistor, such that said third PMOS transistor turns on when said first complementary CMOS level input signal is slow thereby inhibiting said npn transistor from conducting; and

(h) a fourth PMOS transistor having its gate connected to receive said second complementary CMOS level input signal, its drain connected to the base of said npn transistor, and its source commonly connected to both the collector of said npn transistor and a first reference voltage, such that said fourth PMOS transistor turns on when said second complementary CMOS level input signal goes low, such that said npn transistor conducts and shortens the rise time needed for said output gain stage to transition from said ECL low level voltage to said ECL high level voltage.

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**5,036,225**

**TTL-ECL LEVEL CONVERTING CIRCUIT**

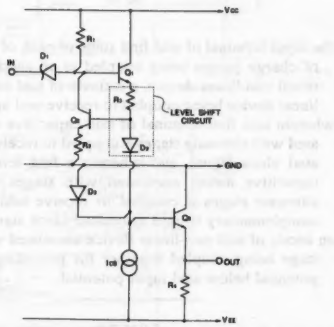
**Kouji Matsumoto, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Oct. 6, 1989, Ser. No. 417,973**

**Claims priority, application Japan, Oct. 6, 1988, 63-252682**

**Int. Cl.[5] H03K** *19/003, 17/04*

**U.S. Cl. 307—475** **10 Claims**




1. TTL-ECL converting circuit comprising a Schottky barrier diode having a cathode connected to an input terminal for a TTL signal and an anode connected to a first connection node; a resistor having one end connected to a high voltage supply line and another end connected to said first connection node; a first transistor having a collector connected to said high voltage supply line, a base connected to said first connection node and an emitter connected to a second connection node; a first level shift means having one end connected to said second connection node and another end connected to a third connection node; a second level shift means having one end connected to said third connection node and another end connected to a fourth connection node; a constant current source having one end connected to said fourth connection node and, another end connected to a low voltage supply line; a second transistor having a collector connected to said first connection node, a base connected to said third connection node and an emitter connected through another resistor to an intermediate voltage supply line which has a potential independent of that of said fourth connection node; a diode having an anode connected to said intermediate voltage supply line and a cathode connected to said fourth connection node; and an emitter follower connected between said intermediate voltage supply line and said low voltage supply line and having an input connected to said fourth connection node and an output connected to an output terminal for an ECL signal.

**5,036,226**

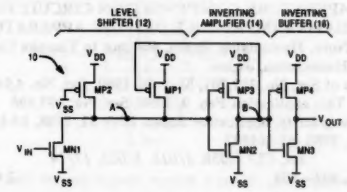
**SIGNAL CONVERTING CIRCUIT**

**Thao T. Tonnu, Lemon Grove; Mukesh B. Suthar, Santa Clara, and Charles A. Kaseff, San Diego, all of Calif., assignors to NCR Corporation, Dayton, Ohio**

**Filed Oct. 23, 1989, Ser. No. 426,615**

**Int. Cl.[5] H03K** *19/0175, 19/20*

**U.S. Cl. 307—475** **11 Claims**




1. A converter circuit for converting a first set of logic signals into a second set of logic signals, comprising:

a first transistor of a first conductivity type and having first, second and control terminals, with its control terminal connected for receiving the first set of logic signals, and having its first terminal connected to a first voltage source representing a first logic level of the second set of logic signals, each of the first set of logic signals being at a voltage level sufficient to enable said first transistor; and

a second transistor of a second conductivity type having first, second and control terminals, with its control terminal connected to said first voltage source and having its first terminal connected to a second voltage source representing a second logic level of the second set of logic signals, said first voltage source being sufficient to enable said second transistor;

the second terminals of said first and second transistors connected to each other for providing signals representing the second set of logic signals.

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**5,036,227**

**ROW ADDRESS STROBE SIGNAL INPUT BUFFER FOR PREVENTING LATCH-UP**

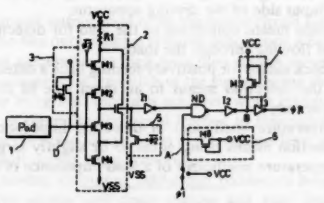
**Sooin Jo, Seoul, and Jaiwhan Yu, Kyungi, both of Rep. of Korea, assignors to Samsung Electronics Co., Ltd., Rep. of Korea**

**Filed Feb. 27, 1990, Ser. No. 485,911**

**Claims priority, application Rep. of Korea, Nov. 18, 1989, 89-16903**

**Int. Cl.[5] H03K** *19/02, 19/096*

**U.S. Cl. 307—480** **5 Claims**




1. A row address strobe signal input buffer comprising:

a pad receiving an input row address strobe signal;

a Schmitt trigger means connected to receive said row address strobe signal from said pad, and responsive to a start-up signal;

a control section responsive to said start-up signal, and connected to an output of said Schmitt trigger means;

a NAND gate and inverters connected to an output of said control section;

a first pre-charge means for preventing a floating state at the time of power source voltage supply, said first pre-charge

means being connected between said pad and said Schmitt trigger; and

a second pre-charge means for preventing a floating state connected to an input of one of said inverters which provides an output of the row address strobe signal input buffer.

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**5,036,228**

**TEMPERATURE COMPENSATION CIRCUIT FOR NEGATIVE IMPEDANCE DRIVING APPARATUS**

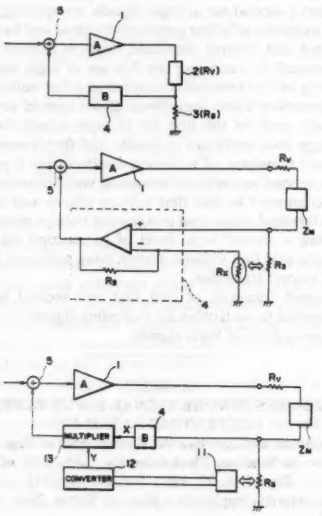
**Masao Noro, Hamamatsu, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan**

**Division of Ser. No. 357,701, May 26, 1989, Pat. No. 4,944,020. This application Feb. 9, 1990, Ser. No. 477,498**

**Claims priority, application Japan, May 31, 1988, 63-133389; Jun. 29, 1988, 63-161992**

**Int. Cl.[5] H03K** *3/013, 3/023, 17/14*

**U.S. Cl. 307—491** **2 Claims**




1. A driving apparatus for effecting a negative impedance driving of a load, comprising:

means for driving of a load in response to an input signal at an input side of the driving apparatus;

detection means connected to the load for detecting a current flowing through the load;

feed back means for positively feeding back a detected result of the detection means to an input side of the driving apparatus;

a temperature coefficient of detection impedance of said detection means being equal to or slightly larger than a temperature coefficient of a load impedance of said load.

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**5,036,229**

**LOW RIPPLE BIAS VOLTAGE GENERATOR**

**Dung Q. Tran, San Jose, Calif., assignor to Gazelle Microcircuits, Inc., Santa Clara, Calif.**

**Filed Jul. 18, 1989, Ser. No. 381,566**

**Int. Cl.[5] G06G** *7/12;* **H03K** *3/01*

**U.S. Cl. 307—497** **6 Claims**

1. A structure for providing a second potential below an input potential comprising:

a plurality of charge pumps connected in parallel, each charge pump being coupled to receive an associated clock signal and its complement, each associated clock signal having a different phase, each charge pump comprising,

a plurality of stages including a first and a last stage, each of said stages having an input terminal being a second terminal of a capacitive means and an output terminal being an anode of an associated non-linear device, a cathode of said associated non-linear device being coupled to said second terminal of said capacitive means, a first terminal of said capacitive means being coupled to receive either said associated clock signal or its complement,

said plurality of stages being serially connected such that said output terminal of each stage, except said last stage, is coupled to the input terminal of a succeeding stage,

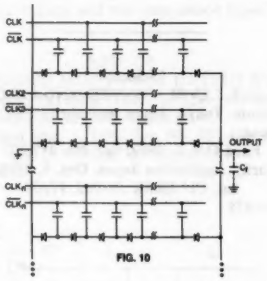


FIG. 10

the input terminal of said first stage of each of said plurality of charge pumps being coupled to an anode of an additional non-linear device, a cathode of said additional non-linear device being coupled to receive said input potential,

wherein said first terminal of said capacitive means associated with alternate stages is coupled to receive said associated clock signal, and wherein a first terminal of said capacitive means associated with stages adjacent said alternate stages is coupled to receive said clock signal complementary to said associated clock signal,

an anode of said non-linear device associated with each last stage being coupled together for providing said second potential below said input potential.

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**5,036,230**

**CMOS CLOCK-PHASE SYNTHESIZER**

**Mel Bazes, Haifa, Israel, assignor to Intel Corporation, Santa Clara, Calif.**

**Filed Mar. 1, 1990, Ser. No. 486,904**

**Int. Cl.[5] H04L** *7/08;* **H03K** *5/13, 5/159, 21/36*

**U.S. Cl. 307—527** **18 Claims**

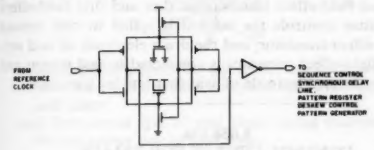
1. An integrated circuit for changing the phase relationship between at least two clock-phase outputs and a reference clock, said clock-phase outputs being generated by a digital waveform synthesizer including a synchronous delay line (SDL) coupled to at least two digital-to-time domain converters (DTCs), said SDL generating N taps, said taps corresponding to the resolution of said clock-phase outputs said DTCs outputting said clock-phase outputs, said DTCs being further coupled to a pattern register, said pattern register being coupled to a pattern generator, said integrated circuit comprising:

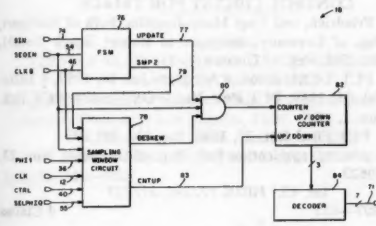
a sequence control coupled to said reference clock over a clock buffer for receiving a plurality of frequencies therefrom, said sequence control being further coupled to said SDL for generating a plurality of global signals for triggering said digital waveform synthesizer, said sequence control being coupled to said pattern generator for synthesizing a plurality of clock-phase waveforms;

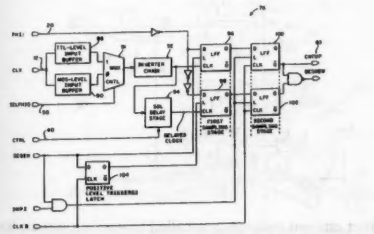
at least one shifter coupled to said pattern register for minimizing the delays of said clock-phase outputs with respect to said reference clock, said shifter being coupled to said pattern generator for receiving a plurality of pattern bits

therefrom, said plurality of pattern bits representing said plurality of clock-phase waveforms; and

a deskew control being coupled to one of said clock-phase outputs and to said reference clock for determining the skew between said one of said clock-phase outputs and said reference clock, said deskew control being further







coupled to said shifter for generating a plurality of control signals for minimizing the skew between said clock-phase outputs and said reference clock, said deskew control being further coupled to said pattern generator and to said sequence control for stretching the clock cycles of said clock-phase outputs in debugging the logic path of any integrated circuit.

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**5,036,231**

## SENSE AMPLIFIER CIRCUIT USING THEN FILM TRANSISTORS

**Minoru Kanbara, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan**

**Filed May 1, 1990, Ser. No. 517,352**

**Claims priority, application Japan, May 15, 1989, 1-120749**

**Int. Cl.[5] H03K** *5/22*

**U.S. Cl. 307—530** **1 Claim**

1. A sense amplifier circuit using thin film transistors, comprising:

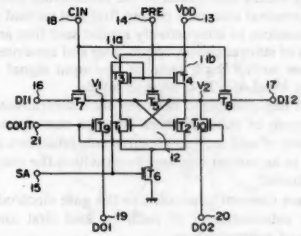
an amplifier including first and second inverter circuits each having a pair of thin film transistors and means for connecting said first and second inverter circuits in a cross-coupled configuration;

a precharging thin film transistor connected between said first and second inverter circuits;

first and second input terminals;

first and second signal input transfer gates respectively connected between said first and second inverter circuits and said first and second input terminals;

first and second output terminals; and



first and second signal output transfer gates respectively connected between said first and second inverter circuits and said first and second output terminals.

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**5,036,232**

## PUSH-PULL OUTPUT STAGE OF INTEGRATED CIRCUIT PROVIDING ENHANCED HIGH-LOW VOLTAGE LEVEL SIGNAL TRANSITION WITH GROUND BOUNCE CONTROL

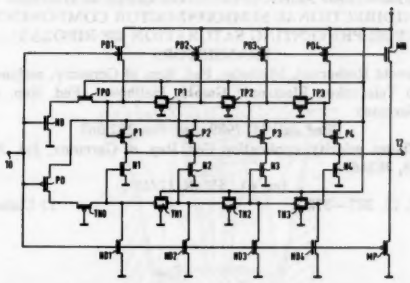
**Horst A. Jungert, Buch am Erlbach, and Manfred H. Müller, Nandlstadt, both of Fed. Rep. of Germany, assignors to Texas Instruments Deutschland GmbH, Fed. Rep. of Germany**

**Filed Feb. 15, 1990, Ser. No. 480,441**

**Claims priority, application Fed. Rep. of Germany, Feb. 17, 1989, 3904901**

**Int. Cl.[5] H03K** *3/013, 5/13, 17/28, 17/687*

**U.S. Cl. 307—542** **4 Claims**



1. A push-pull output stage of an integrated circuit for generating a pulse-like output signal in dependence upon a pulse-like input signal susceptible to high switching speeds wherein the high-low voltage level transition of the signal during the operation of the integrated circuit is achieved while inhibiting the overshoot of the pulse-like signal leading to inaccurate interpretation of the pulse-like signal as to the voltage level thereof, said push-pull output stage comprising:

a first plurality of output field-effect transistors having respective source and drain regions and gate electrodes extending therebetween, said first plurality of output field-effect transistors being connected in parallel and defining a first group of subtransistors;

a second plurality of output field-effect transistors of opposite channel polarity with respect to said first plurality of output field-effect transistors and having respective source and drain regions and gate electrodes extending therebetween, said second plurality of output field-effect transistors being connected in parallel and defining a second group of subtransistors;

each of said subtransistors of said first group of subtransis-

tors being connected in series to the corresponding subtransistors of said second group of subtransistors;

an input terminal for receiving the input signal and connected to said first and second groups of subtransistors;

switching means interposed in the connection between said input terminal and each of said first and second groups of subtransistors to alternatively render said first and second groups of subtransistors conductive and nonconductive in response to the logic state of the input signal at a high voltage level or a low voltage level;

an output line connected between each subtransistor of said first group of subtransistors and the corresponding subtransistor of said second group of subtransistors and terminating in an output terminal from which the output signal is produced;

a resistance element connected to the gate electrode of each of the subtransistors of each of said first and second groups of subtransistors;

the resistance elements connected between the gage electrodes of consecutive subtransistors of each of said first and second groups of subtransistors respectively comprising a pair of complementary parallel-connected field-effect transistors;

a disconnecting field-effect transistor connected to each subtransistor of each of said first and second groups of subtransistors; and

a control field-effect transistor connected in parallel to each of said first and second groups of subtransistors, each said control field-effect transistor being of opposite channel polarity with respect to the subtransistors of the group of subtransistors to which the respective control field-effect transistor is connected in parallel, each said control field-effect transistor being connected with respect to the input signal and the output signal as a source follower.

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**5,036,233**

## INTEGRATED SEMICONDUCTOR CIRCUIT HAVING A UNIDIRECTIONAL SEMICONDUCTOR COMPONENT FOR PREVENTING SATURATION OF BIPOLAR TRANSISTORS

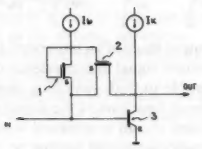
**Albrecht Rothermel, Mülheim, Fed. Rep. of Germany, assignor to Telefunken Electronic GmbH, Heilbronn, Fed. Rep. of Germany**

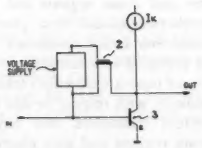
**Filed Jul. 14, 1989, Ser. No. 382,065**

**Claims priority, application Fed. Rep. of Germany, Jul. 20, 1988, 3824694**

**Int. Cl.[5] H03K** *17/60*

**U.S. Cl. 307—570** **13 Claims**




1. In an integrated semiconductor circuit having at least one input and an output, a first bipolar transistor with a base electrode, a collector electrode and an emitter electrode, coupled to a reference level, and unidirectional semiconductor circuit means, connected between the collector electrode and the base electrode, for preventing saturation of said first bipolar transistor; the improvement wherein said unidirectional semiconductor circuit means comprises:

first and second field-effect transistors, each field-effect transistor having a gate electrode, a source electrode and a drain electrode and being arranged so that the source electrodes of said first and second field-effect transistors are connected to said input and said base electrode of said first bipolar transistor; the drain electrode of said first field-effect transistor is connected to a current supply; the gate electrode and the drain electrode of said first field-effect transistor are connected to the gate electrode of said second field-effect transistor so that said first field-effect transistor controls the current supplied to said second field-effect transistor; and the drain electrode of said second field-effect transistor is connected to said output and the collector electrode of said first bipolar transistor.

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**5,036,234**

## CONTROL CIRCUIT FOR TRIACS

**Hornung Friedrich, and Vogt Hans-Joachim, both of Stuttgart, Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

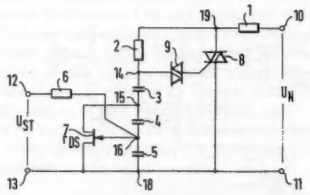
**PCT No. PCT/DE88/00664, § 371 Date Jul. 24, 1989, § 102(e) Date Jul. 24, 1989, PCT Pub. No. WO89/05056, PCT Pub. Date Jun. 1, 1989**

**PCT Filed Oct. 27, 1988, Ser. No. 392,993**

**Claims priority, application Fed. Rep. of Germany, Nov. 23, 1987, 3739623**

**Int. Cl.[5] H03K** *17/292, 17/725*

**U.S. Cl. 307—632** **4 Claims**




1. A direct current voltage controlled triggering circuit for a triac which in series with a power consumer is connected to a source of alternating current supply voltage ($U_N$), comprising a source of direct current control voltage ($U_{ST}$); a field effect transistor; a series connection of a load resistor, a load capacitor, and two additional capacitors, said series connection being connected via said power consumer to said source of alternating current supply voltage ($U_N$); a connection point of said load resistor and said load capacitor being connected via a biac to the control electrode of said triac; the drain-source channel of said field effect transistor being connected in parallel with said series connected two additional capacitors; and a connection point of said two additional capacitors being connected to the gate of said field effect transistor and to a terminal of said source of direct current control voltage ($U_{ST}$).

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**5,036,235**

## BRUSHLESS DC MOTOR HAVING A STABLE HYDRODYNAMIC BEARING SYSTEM

**Robert J. Kleckner, N. Tarrytown, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Jul. 25, 1990, Ser. No. 557,108**

**Int. Cl.[5] F16C** *39/06*

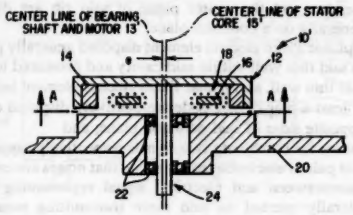
**U.S. Cl. 310—90.5** **30 Claims**

16. A brushless DC motor for use in a laser scanner comprising:

a stator comprising a core positioned about a first center line, said core having windings arranged thereabout;

a rotor having an inner diameter and being rotatable about a second center line;

a shaft supporting said rotor at one end thereof and having an axis collinear with said second center line;




magnet means positioned about the inner diameter of said rotor for exerting radial and axial magnetic load forces on said stator;

said first center line of said stator being eccentric to said second center line of said rotor.

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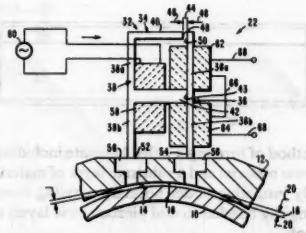
**5,036,236**

## AIR GAP MATCHING PROXIMITY SENSOR FOR MAGNETIC BEARINGS

**Douglas W. Wilson, Westlake Village, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed May 7, 1990, Ser. No. 520,000**
**Int. Cl.[5] H02K** *7/09;* **F16C** *39/06;* **G01B** *7/14*
**U.S. Cl. 310—90.5** **12 Claims**



1. Apparatus for dimensioning a gap between surfaces of relatively movable members of magnetic material, comprising:

means utilizing the magnetic properties of the members for sensing the dimension of the gap through a magnetic circuit passing through the members;

means for comparing the gap dimension with a reference dimension in a reference magnetic circuit; and

means for conforming the gap dimension to the reference dimension.

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**5,036,237**

## SHADED POLE MOTOR

**Sol London, Ft. Wayne, Ind., assignor to Electric Motors and Specialties, Inc., Garrett, Ind.**

**Filed Apr. 9, 1990, Ser. No. 506,949**
**Int. Cl.[5] H02K** *17/10*
**U.S. Cl. 310—172** **9 Claims**

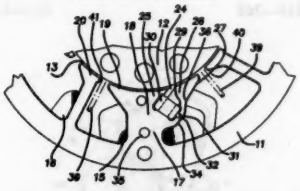
1. An electric motor comprising a stator and a rotor interacting through an air gap;

said stator having a salient pole with a surface of the salient pole forming the profile of a narrow neck and a wide pole shoe;

a shaded coil slot extending into said salient pole from the air gap and defining a shaded portion of said pole;

an exposed side on said shaded portion of said salient pole;

a shading pole aperture in said shaded portion of said salient pole closer to said exposed side of the shaded portion of said salient pole than said shading coil slot, a space of the aperture being enclosed by the shaded portion of the salient pole including a relatively thin part of the shaded portion between the aperture and the exposed surface in said relatively thin part being substantially smaller than a size of the aperture whereby a relatively smooth shape is



imparted to said exposed side of said salient pole for ease of insulating the surface of said salient pole to receive a stator winding; and

a shading coil substantially surrounding the shaded portion of said salient pole and having one shading coil side in said slot and another shading coil side in said aperture.

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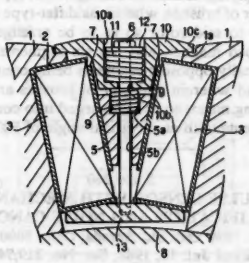
**5,036,238**

## ROTOR OF SALIENT-POLE TYPE ROTARY MACHINE

**Masaaki Tajima, Nagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 11, 1990, Ser. No. 551,126**
**Claims priority, application Japan, Jul. 19, 1989, 1-84811**
**Int. Cl.[5] H02K** *9/00*
**U.S. Cl. 310—214** **8 Claims**



1. A rotor of a salient-pole type rotary machine comprising:

a coil brace disposed between adjacent magnetic poles through a coil brace insulator to hold field coils;

a holder engaged and supported by said magnetic poles in a position above said coil brace;

a coil supporting plate disposed under said field coils, said coil supporting plate being in abutment with the field coils to press and thereby support the coils between it and coil receiving portions of said magnetic poles;

a mounting bolt extending through both said holder and said coil brace and engaged threadedly with said coil supporting plate;

a first elastic member interposed between a lower surface of said holder and an upper surface of said coil brace; and

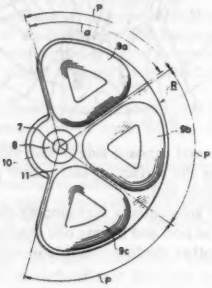
a second elastic member interposed between a lower end of a head portion of said mounting bolt, said head portion being larger in diameter than the other portion of the mounting bolt, and an upper surface of said holder.

5,036,239

## FLAT CORELESS VIBRATOR MOTOR

Tadao Yamaguchi, Isesaki, Japan, assignor to Tokyo Parts Electronic Co., Ltd., Isesaki, Japan

Filed May 22, 1990, Ser. No. 526,737
Claims priority, application Japan, Aug. 26, 1988, 63-111868
Int. Cl.[5] H02K 7/075
U.S. Cl. 310—268 4 Claims




1. A flat, coreless vibrator motor, comprising:
casing means for housing said motor;
a shaft rotatably supported by said casing means;
a rotor mounted on said shaft, said rotor being generally in the shape of a sector;
three armature coils provided on said rotor and angularly arranged at a predetermined pitch angle about said shaft, said armature coils being in non-overlapping relationship with each other;
a ring-shaped magnet mounted on said casing means, said ring-shaped magnet being magnetized so as to have alternate north and south poles arranged around a center axis of said shaft at a pitch angle of 90°; and
means for supplying electric power to said armature coils, said supplying means including a flat-type commutator and a pair of brushes, wherein said flat-type commutator is attached to said rotor so as to be arranged within said ring-shaped magnet, and has six segments, each pair of diametrically opposing segments being connected to each other, and wherein said pair of brushes are mounted on said casing means so as to be urged into contact with said six segments with an electrical angle of 90°.

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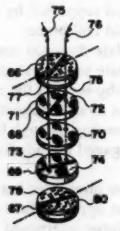
5,036,240

## IMPULSE SENSOR WITH MECHANICAL PREAMPLIFICATION AND NOISE CANCELLATION

Hyok S. Lew, 7890 Oak St., Arvada, Colo. 80005

Filed Jul. 18, 1988, Ser. No. 219,744
Int. Cl.[5] H01L 41/08
U.S. Cl. 310—338 11 Claims




1. A device for detecting forces comprising in combination:
a) a container vessel including a cavity surrounded by a thin wall on one side and by rigid walls on other sides, wherein external surface of said thin wall includes a rib disposed diametrically thereacross;
b) a force transmitting member extending from said thin wall for transmitting force laterally exerted thereon to said thin wall, wherein the central axis of said force transmitting member and the center plane of said rib are disposed generally on a common plane;
c) a planar Piezo electric element disposed generally parallel to said thin wall within said cavity and pressured towards said thin wall, said planar Piezo electric element including at least a pair of electrodes respectively disposed on two opposite sides of said common plane; and
d) means for combining two signals respectively supplied by said pair of electrodes in such way that noises are canceled therebetween and electrical signal representing forces laterally exerted on said force transmitting member is extracted.

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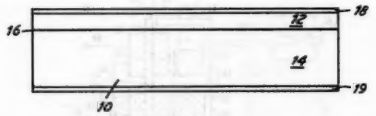
5,036,241

## PIEZOELECTRIC LAMINATE AND METHOD OF MANUFACTURE

A. John Michaelis, Glen Ellyn, Ill., and A. David Paton, Cambridge, England, assignors to XAAR Ltd., Cambridge, England

Filed Feb. 3, 1989, Ser. No. 306,736
Claims priority, application United Kingdom, Feb. 4, 1988, 8802506
Int. Cl.[5] H01L 41/08
U.S. Cl. 310—358 5 Claims




1. A method of forming a poled laminate including a layer of piezoelectric material and a substrate layer of material which is electrically insulating under normal operating conditions and which is rigidly bonded to said piezoelectric layer, comprising the steps of:
doping said substrate layer to increase the conductivity thereof;
applying a poling voltage to pole the piezoelectric material at a temperature at which the conductivity of the substrate layer is greater than that of the piezoelectric layer by at least an order of magnitude and for a relatively short time interval which causes a substantial part of the applied voltage to be applied across said piezoelectric layer; and
maintaining the poling voltage after said interval until said piezoelectric material is effectively poled.

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5,036,242

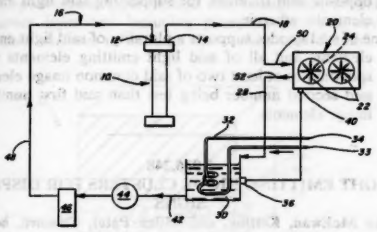
## LAMP COOLING SYSTEM

James V. Huber, Oak Park; Bhakti S. Patel, Bensenville, and Jacob Tikhtman, Lincolnwood, all of Ill., assignors to Atlas Electric Devices Company, Chicago, Ill.

Filed Oct. 19, 1989, Ser. No. 424,111
Int. Cl.[5] H01J 7/26
U.S. Cl. 313—35 13 Claims

1. A lamp cooling system, which comprises, in combination:
a liquid-cooled lamp having passage means for flow of liquid coolant therethrough, including a cool fluid inlet and a heated fluid outlet; a flow circuit conduit extending between the outlet and inlet; liquid/air heat exchange means positioned in said flow circuit conduit to cool liquid flow-

ing therein by heat exchange with air; deionizing means positioned in said flow circuit conduit to deionize liquid



flowing therein; and liquid pump means for said flow circuit conduit to circulate cooling liquid therethrough.

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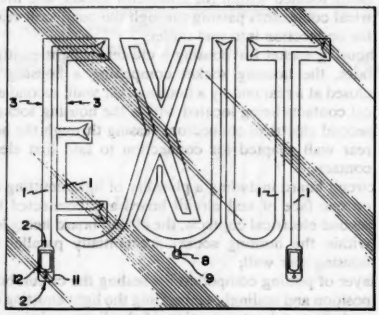
**5,036,243**

**GLASS PLATE ILLUMINATION DEVICE SIGN WITH INTEGRAL ELECTRODES OF PARTICULAR THERMAL RESISTANCE**

**Franklin H. Cocks, 5 Learned Pl., Durham, N.C. 27705, and Peter W. Farner, 3315 Lorraine, Kalamazoo, Mich. 49008**

**Filed Dec. 18, 1989, Ser. No. 452,204**
**Int. Cl.[5] H01J *17/20*; G09F *13/26***
**U.S. Cl. 313—39** **8 Claims**



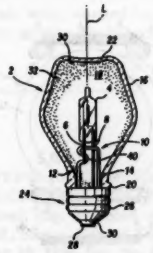

1. A gas-discharge illumination device comprising at least two glass plates said plates being hermetically sealed to provide at least one electrical gas discharge channel cut into at least one of the said glass plates said plates being hermetically sealed to provide at least one electrical gas discharge channel cut into at least one of the said glass plates, said channel being provided with evacuation and gas filling means and further supplied with at least two electrodes contained integrally within the body of said glass plates in electrode chambers which communicate with the said gas discharge channel, said electrodes being further supplied with thermal insulation means such that the the thermal resistance afforded to the flow of heat from the said electrodes to the glass plates per unit area is at least 5 degrees centrigrade/watt/square centimeter and provided further that the current supplied to the electrodes is less than 40 milliamperes but more than 1 milliampere and the voltage at which this current is supplied is less than 18,000 volts but more than 1000 volts and furthermore provided that the gas pressure in the electrical gas discharge channel is less than 35 millitorr but more than 1 millitorr.

**5,036,244**

**LIGHT-DIFFUSING COATING FOR A GLASS ELECTRIC LAMP BULB**

**John W. Shaffer, Danvers, Mass., assignor to GTE Products Corporation, Danvers, Mass.**

**Filed Dec. 20, 1989, Ser. No. 453,524**
**Int. Cl.[5] H01J *5/16***
**U.S. Cl. 313—116** **6 Claims**



1. A light diffusing outer envelope for a double enveloped tungsten halogen lamp, said outer envelope comprising:

(a) a molded light-transmissive glass body enclosing a cavity, said body having an interior surface substantially surrounding said cavity; and

(b) a light diffusing coating on said interior surface, said coating including silica particles and potassium silicate.

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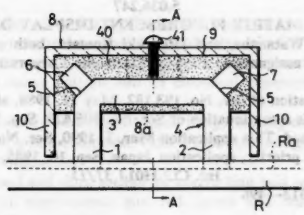
**5,036,245**

**ULTRASONIC LINEAR MOTOR**

**Kazumasa Ohnishi; Toru Nakazawa, both of Nagaoka, and Yukimitsu Manabe, Niigata, all of Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan**

**Filed Nov. 13, 1989, Ser. No. 435,321**
**Claims priority, application Japan, Dec. 5, 1988, 63-158158**
**Int. Cl.[5] H01L *41/08***
**U.S. Cl. 310—323** **3 Claims**



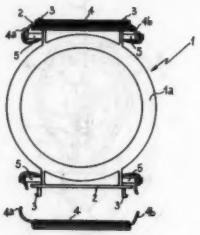
1. In an ultrasonic linear motor including a traveling member having columnar leg portions and a body member connecting said leg portions, wherein one end of each said leg portions abuts against a traveling surface, and a pair of piezoelectric elements mounted on opposing end surfaces of said body member for vibrating said leg portions in a direction intersecting an axis of said leg portions; the improvement comprising a cover provided around said traveling member for covering said traveling member and a protecting member filled inside said cover in such a manner as to fully cover said pair of piezoelectric elements for protecting said pair of piezoelectric elements from an external environment, said cover having means for mechanically contacting with said traveling member; wherein said means for mechanically contacting with said traveling member comprises an adjusting screw insertable from said cover through said protecting member to abut with said traveling member.

**5,036,246**

## COMPENSATED DEFLECTION YOKE FOR CATHODE-RAY TUBES

**Emilio Germani, Milan, Italy, assignor to Eldor S.p.A., Milan, Italy**

**Filed Jun. 1, 1989, Ser. No. 360,080**
**Claims priority, application Italy, Oct. 31, 1988, 22475 A/88**
**Int. Cl.[5] H01J *29/70*; H04N *5/645***
**U.S. Cl. 313—440** **4 Claims**



1. A compensated deflection yoke for cathode-ray tubes comprising a yoke body having horizontal coils mounted on plastic supports said horizontal coils emitting a stray field, said yolk body having a base which relates to a plastic crown circumferentially incorporating two compensation coils for emitting a compensating field which is opposite to the stray field emitted by the deflection yoke horizontal coils, said plastic supports having a, polygonal form with rounded edges and being mounted onto the top and bottom sides of the yoke and at right angles to a plane of the yoke, each of said plastic supports being provided with hooks extending at right angles and on symmetric ends of said supports and being designed to receive with snap-fit the compensation coils, plastic pins disposed so that they project with respect to said supports to secure terminals of the coil, said pins being also able to support a damping cell having a resistor connected in series with a capacitor, said compensation coils having a variable number of turns, and being coupled together and to the horizontal coils of the deflection yoke.

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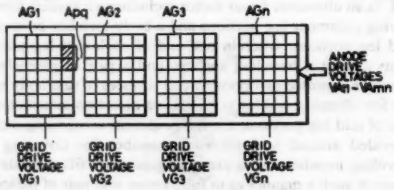
**5,036,247**

## DOT MATRIX FLUORESCENT DISPLAY DEVICE

**Tomomi Watanabe, and Hiroyuki Komata, both of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan**

**Continuation of Ser. No. 193,182, May 11, 1988, abandoned, which is a continuation of Ser. No. 905,429, Sep. 10, 1986, abandoned. This application Mar. 7, 1990, Ser. No. 492,393**
**Claims priority, application Japan, Sep. 10, 1985, 60-138609**
**Int. Cl.[5] H01J *31/15***
**U.S. Cl. 313—496** **7 Claims**




1. A dot-matrix display including a fluorescent display tube comprising:

a first number of image elements, wherein respective first and second groups of said image elements are provided for forming first and second images, said first and second groups have some image elements in common, and there is at least one light emitting element for each image element;

a filament;

a grid; and

a second number of anodes, disposed on a side of said grid opposite said filament, for supporting said light emitting elements, wherein

one of said anodes supports a plurality of said light emitting elements and all of said light emitting elements corresponding to at least two of said common image elements, said second number being less than said first number of image elements.

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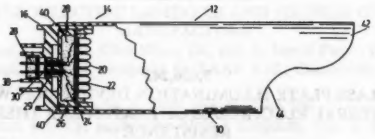
**5,036,248**

## LIGHT EMITTING DIODE CLUSTERS FOR DISPLAY SIGNS

**Vince McEwan, Kettlby, and Milan Patel, Concord, both of Canada, assignors to Ledstar Inc.**

**Continuation of Ser. No. 331,390, Mar. 31, 1989, abandoned. This application Nov. 8, 1990, Ser. No. 610,309**
**Int. Cl.[5] H01L *33/00***
**U.S. Cl. 313—500** **7 Claims**



1. A light emitting diode cluster unit for outdoor use comprising:

a connector socket for direct connection into an electrical outlet of an electrically operated display outlet, the connector socket comprising a connector sleeve closed at a rear end by a connector rear wall, first electrical contacts being located within the connector socket, and first electrical connectors passing through the connector rear wall for connection into said outlet;

a housing socket for housing a cluster of light emitting diodes, the housing socket comprising a housing sleeve closed at a rear end by a housing rear wall, second electrical contacts being located within the housing socket, and second electrical connectors passing through the housing rear wall adapted for connection to said first electrical contacts;

a circuit board including a plurality of light emitting diodes on one face of said circuit board and connected to said second electrical contacts, the circuit board being located within the housing socket substantially parallel to the housing rear wall;

a layer of potting compound for sealing the circuit board in position and sealingly embedding the light emitting diodes such that at least a portion of the light omitting diodes project forwardly out of the potting compound; and

weather sealing means arranged between the connector sleeve and the housing sleeve in sealing contact with both said sleeves for substantially preventing the intrusion of undesirable elements beyond said weather sealing means;

wherein the housing socket is slidably and substantially fully nested within the connector socket by slidable engagement of the housing sleeve within the connector sleeve.

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**5,036,249**

## ELECTROLUMINESCENT LAMP PANEL AND METHOD OF FABRICATING SAME

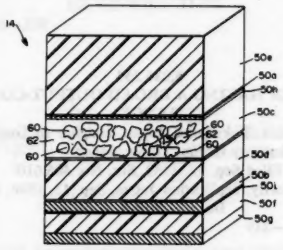
**Maciej J. Pike-Biegunski, Warrenville; Paul Krebaum, Lisle, and Don A. Arneson, South Elgin, all of Ill., assignors to Molex Incorporated, Lisle, Ill.**

**Filed Dec. 11, 1989, Ser. No. 448,735**
**Int. Cl.[5] H05B *33/02*; G01D *11/28***
**U.S. Cl. 313—509** **9 Claims**

1. An electroluminescent lamp panel, comprising:

a front base layer of polyester material;

a transparent electrode behind the front base layer;
a transparent insulating barrier layer behind the transparent electrode;
a phosphorescent layer behind the transparent insulating barrier layer and including phosphor particles having etched surfaces to increase the surface area thereof, the




phosphor particles being interspersed in an active resin having scavenging properties;
a dielectric layer behind the phosphorescent layer;
a base electrode behind the dielectric layers;
an insulation layer of polyester material behind the base electrode; and a moisture barrier layer on the back of the panel behind the insulation layer.

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**5,036,250**

## PICTURE DISPLAY DEVICE WITH CORE MEANS COMPRISING COMPENSATION COILS

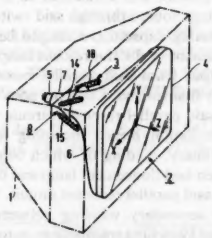
**Albertus A. S. Sluyterman, Eindoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed May 31, 1989, Ser. No. 359,319**

**Claims priority, application Netherlands, Jun. 14, 1988, 8801512; Nov. 15, 1988, 8802802**

**Int. Cl.[5] H01J *29/00***

**U.S. Cl. 315—8** **7 Claims**




1. A picture display device having a display tube whose rear portion includes a cylindrical neck accommodating a device for generating electron beams and whose front portion is funnel-shaped, the widest portion being present on the front side and including a phosphor display screen, the display tube having a longitudinal axis extending concentrically through the neck and the front portion, an electro-magnetic deflection unit mounted around a part of the display tube for deflecting electron beams across the display screen, the electro-magnetic deflection unit including a line deflection coil having two line deflection coil halves wherein one line deflection coil half is disposed on on each side of a plane of symmetry, and a field deflection coil, comprising:

compensation coil means for generating a magnetic compensation field which is oppositely directed to a line frequency radiation field in front of the display screen wherein the compensation coil means is proximate to a screen end of the deflection unit and includes one pair of core means disposed in a core plane whose normal is transverse to the longitudinal axis of the display tube, each core means having a longitudinal axis and comprising a rod-shaped magnetic core portion and a coil the core means being positioned symmetrically with respect to the plane of symmetry and symmetrically with respect to a plane which includes the longitudinal tube axis and which is transverse to the plane of symmetry, the longitudinal axes of the core means intersecting the plane of symmetry at substantially the same, retrograde point at an acute angle in the plane of symmetry, and the centers of the core means of each pair being situated between the center of the deflection unit and the display screen.

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**5,036,251**

## DEVICE FOR CONTROLLING IMAGE PATTERN OF A COMPUTER-CONTROLLED TELEVISION

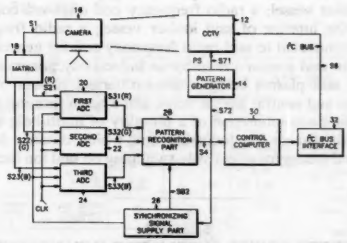
**Kyoung-Guen Lee, Seoul, Rep. of Korea, assignor to SamSung Electronics Co., Ltd., Suwon, Rep. of Korea**

**Filed May 10, 1990, Ser. No. 521,383**

**Claims priority, application Rep. of Korea, May 10, 1989, 1989-6204[U]**

**Int. Cl.[5] H01J *31/26***

**U.S. Cl. 315—10** **6 Claims**




1. A device for controlling an image pattern of a computer-controlled television (CCTV) having a deflecting circuit, comprising:

a pattern generator for producing an image pattern containing a synchronous signal for display by said CCTV;

means for sensing said image pattern and converting said sensed image pattern into an electrical composite video signal;

means operably connected to said image sensing means, for separating said composite video signal into red, green, and blue components;

first, second and third means for converting said red, green and blue components into red, green and blue digital signals, respectively;

means operably connected to said pattern generator, for providing said synchronous signal to said pattern generator, said synchronous signal being coupled to said respective first second and third converting means, whereby said first, second and third converting means synchronize with said pattern generator;

a pattern recognizer for comparing the output of said first, second and third converting means with a reference pattern programmed in advance to control said CCTV, and for producing parameters for respective horizontal, vertical and alignment characteristics according to said comparing result; and

a control computer for comparing said parameters with reference parameters and thereby producing control data according to said comparing result, said control data being coupled to said CCTV to equalize distortion of said image pattern.

5,036,252

## RADIO FREQUENCY ION BEAM SOURCE

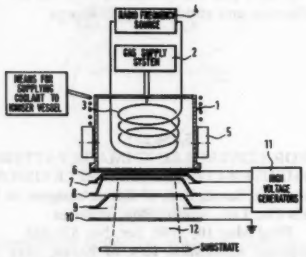
Horst Löb, Giessen, Fed. Rep. of Germany, assignor to Hauzer Holding BV, Venlo, Netherlands

Filed Apr. 24, 1989, Ser. No. 342,220

Claims priority, application Fed. Rep. of Germany, Apr. 26, 1988, 3814053

Int. Cl.[5] H01J *27/16*

U.S. Cl. 315—111.31 38 Claims




1. A radio frequency ion beam source for producing an ion beam of a desired energy and current density, said ion beam source comprising a metallic conductive ioniser vessel having an interior, means for feeding a working gas to be ionised into said ioniser vessel; a radio frequency coil disposed coaxially within the interior of said ioniser vessel; a radio frequency source connected to said radio frequency coil for generating a plasma in said ioniser vessel by an inductively generated discharge, said plasma being a non-isothermal plasma of ions, electrons and neutral gas particles; and a beam forming system comprising a combination of a plurality of multi-hole extraction grids and an ion focussing unit which directly follows them; and means for selectively switching on said ion focussing unit.

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5,036,253

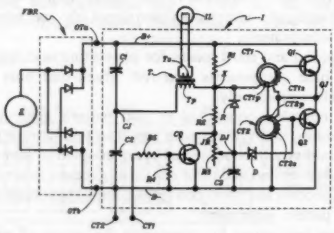
## INVERTER POWER SUPPLY FOR INCANDESCENT LAMP

Ole K. Nilssen, Caesar Drive, Barrington, Ill. 60010

Continuation of Ser. No. 667,691, Nov. 2, 1984, which is a continuation-in-part of Ser. No. 487,817, Apr. 22, 1983, Pat. No. 4,506,318. This application Jan. 8, 1990, Ser. No. 461,653

Int. Cl.[5] H05B *41/00*

U.S. Cl. 315—151 16 Claims



1. An arrangement comprising:

a power line providing a power line voltage at a pair of power line terminals;

an incandescent lamp having a pair of lamp terminals; and

means connected in circuit between the power line terminals and the lamp terminals; the means being functional to provide a lamp voltage to the lamp terminals; the lamp voltage consisting of periodic bursts of high frequency voltage; the fundamental frequency of the high frequency voltage being substantially higher than that of the power line voltage; the periodic bursts of high frequency voltage being separated with intervals of zero voltage; each interval of zero voltage having a duration substantially longer than that of a complete cycle of the high frequency voltage.

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5,036,254

## INVERTER HAVING A BROAD OUTPUT-CONTROL RANGE

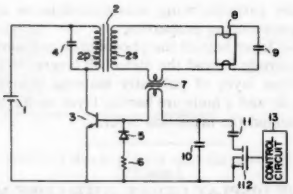
Kelichi Shimizu, Yokohama, Japan, assignor to Toshiba Lighting & Technology Group, Tokyo, Japan

Filed Sep. 12, 1989, Ser. No. 406,610

Claims priority, application Japan, Sep. 13, 1988, 63-227394

Int. Cl.[5] H05B *37/02*

U.S. Cl. 315—219 14 Claims




1. An apparatus for operating a fluorescent lamp comprising:

a DC voltage source for supplying a DC voltage;

a switching transistor for switching the DC voltage supplied from said DC voltage source;

a parallel resonant circuit, including an inductor and a resonant capacitor, for receiving the DC voltage switched by said switching transistor and for generating an AC output, said resonant circuit being connected in series to said switching transistor and connected so as to be fed from said DC voltage source through said switching transistor;

a filament warming capacitor, arranged between end portions of a filament of the fluorescent lamp which receives the AC output from said parallel resonant circuit for warming the filament, said end portions being on a side opposite to said parallel resonant circuit;

self-excited oscillation means including a current transformer, a primary winding of which being connected in series between said fluorescent lamp and one of the output terminals of said parallel resonant circuit, for supplying an output of a secondary winding between the base and emitter of said switching transistor so as to control the ON and OFF condition of said switching transistor and for supplying a base current to said switching transistor;

variable impedance means, connected to a base current supplying path and said self-excited oscillation means and including a series circuit composed of a variable resistance element and a second capacitor, for changing the resistance value of the variable resistance element and for changing a charge amount on said second capacitor, thereby to change the combined impedance value to change the ON period of said switching transistor;

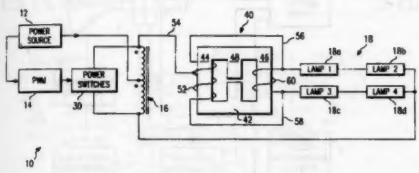
means for discharging an electric charge on said second capacitor during the OFF period of said switching transistor; and

control means, connected to said variable impedance means, for continuously changing the resistance value of said variable resistance element, thereby to change the combined impedance of the variable impedance means to continuously change the ON period of said switching transistor.

## 5,036,255
## BALANCING AND SHUNT MAGNETICS FOR GASEOUS DISCHARGE LAMPS

William E. McKnight, deceased, late of Richardson, Tex., and by Eileen M. McKnight, executrix, 1701 Arvada Dr., Richardson, Tex. 75081

Filed Apr. 11, 1990, Ser. No. 508,598
Int. Cl.[5] H05B *41/36*
U.S. Cl. 315—258 3 Claims




1. A control device for energizing a lamp circuit including multiple gaseous discharge lamps comprising:

a power source having a variable amplitude varying in time;

control means for producing a variable pulse width control signal;

switch means responsive to said variable pulse width control signal for producing a switched output from said power source;

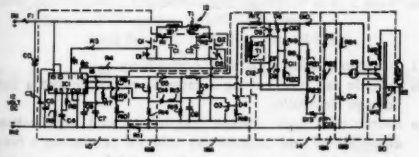
said switched output having a pulse width proportional to said variable pulse width control signal for supplying power to the lamp circuit;

an inductor interconnected between said switch means and the lamp circuit, said inductor having a first winding having first and second ends with a center tap for receiving said switched output from said switch means for balancing the voltage and current applied to the lamps within the lamp circuit, and a second winding having first and second ends, connected to the lamp circuit for providing constant lamp brightness regardless of amplitude variations occurring in said power source.

## 5,036,256
## ARC DISCHARGE BALLAST SUITABLE FOR AUTOMOTIVE APPLICATIONS

Robert L. Garrison, Henniker, N.H., and Harold L. Rothwell, Georgetown, Mass., assignors to GTE Products Corporation, Danvers, Mass.

Filed Jun. 21, 1990, Ser. No. 541,874
Int. Cl.[5] H05B *37/02, 41/36*
U.S. Cl. 315—308 13 Claims



1. A ballast for operating an arc discharge lamp in a dc mode, said ballast comprising:

first and second direct current input terminals;

pulse width modulator means coupled to said first and second direct current input terminals and including high frequency generating means and semiconductor switch means, said high frequency generating means developing a signal means for driving said semiconductor switch means;

first transformer means having primary and secondary windings, said primary winding being coupled to said semiconductor switch means;

rectifier and voltage multiplier means coupled to said secondary winding of said first transformer means for conversion of the voltage across aid secondary winding of said first transformer means to a direct current output voltage having a predetermined value;

first energy storage means coupled to said rectifier and volage multiplier means for storing energy for generating a high voltage spike sufficient for initiating a glow condition in said lamp;

second transformer means coupled to said first energy storage means for applying said high voltage spike to said lamp;

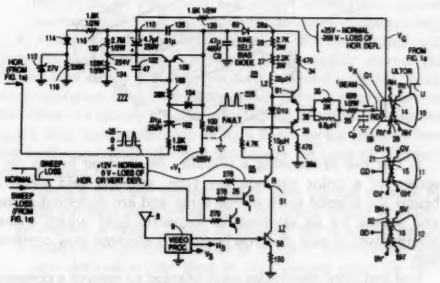
second energy storage means coupled to said rectifier and voltage multiplier means for storing energy for application to said lamp, said second energy storage means being effective in causing a glow-to-arc transition in said lamp; and

voltage and current sensing means for developing a control signal and means for coupling said control signal to said high frequency generating means.

## 5,036,257
## PROJECTION TV DEFLECTION LOSS PROTECTION CIRCUIT

Marvin N. Norman, Noblesville; Lawrence E. Smith, and Peter R. Knight, both of Indianapolis, all of Ind., assignors to Thomson Consumer Electronics, Inc., Indianapolis, Ind.

Filed Apr. 30, 1990, Ser. No. 516,385
Int. Cl.[5] G09G *1/04;* H01J *29/52;* H04N *5/30*
U.S. Cl. 315—381 7 Claims



1. A video display apparatus, comprising:

a cathode ray tube having a cathode electrode, a control grid electrode and a high voltage electrode;

a source of a high voltage coupled to said high voltage electrode of said cathode ray tube for producing a beam current that flows in said cathode electrode;

means for generating a horizontal deflection current in a horizontal deflection winding;

means for generating a vertical deflection current in a vertical deflection winding;

means coupled to said horizontal deflection current generating means for generating a first signal that is indicative of said horizontal deflection current being in normal operation and of a fault condition in said horizontal deflection current when a fault condition in said vertical deflection current occurs;

means coupled to said vertical deflection current generating means for generating a second signal that is indicative of said vertical deflection current being in normal operation and of a fault condition in said vertical deflection current when a fault condition in said horizontal deflection current occurs;

a video amplifier responsive to said first and second signals and coupled to said cathode electrode for generating a cathode electrode voltage at said cathode electrode such that when both deflection currents are in normal operation said video amplifier operates in a normal mode of operation and when a fault condition occurs in any one of

said deflection currents said video amplifier generates said cathode voltage at a level that provides protection against display screen damage; and

means responsive to said first signal and coupled to said grid electrode for generating a grid electrode voltage at said grid electrode such that as long as said first signal is indicative of said horizontal deflection current being in normal operation, even if said fault condition in said vertical deflection current occurs, said grid electrode voltage generating means generates said grid voltage in a normal mode of operation level and, after said first signal becomes indicative of the occurrence of a fault in said horizontal deflection current, said grid electrode voltage generating means generates said grid voltage at a second level that provides protection against said display screen damage.

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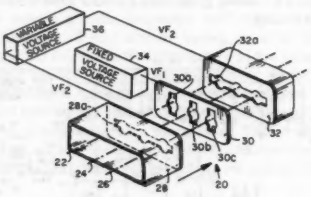
**5,036,258**

## COLOR CRT SYSTEM AND PROCESS WITH DYNAMIC QUADRUPOLE LENS STRUCTURE

**Hsing-Yao Chen, Barrington, and Richard M. Gorski, Glenview, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.**

**Filed Aug. 11, 1989, Ser. No. 392,630**
**Int. Cl.[5] H01J *29/58***
**U.S. Cl. 315—382** **3 Claims**




1. For use in focusing a plurality of electron beams on a screen of a color cathode ray tube, wherein said electron beams are aligned in an in-line array and are deflected across said screen by an asymmetric magnetic field which causes astigmatism of said electron beams, an electron gun comprising:

first and third electrodes each adapted to receive a common dynamic voltage and each having for each beam a keyhole-shaped, horizontally oriented opening through which the electron beam passes;

a second electrode between said first and third electrodes adapted to receive a fixed voltage and having for each beam a vertically oriented, keyhole-shaped aperture,

said first, second and third electrodes, when excited, establishing dynamic quadrupole fields effective to compensate the electron beams for said beam astigmatism.

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**5,036,259**

## DYNAMIC FOCUS SYSTEM FOR CRT DISPLAY

**Leroy A. Sutton, Wheeling, and Norman E. Phoenix, Chicago, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.**

**Filed Nov. 30, 1990, Ser. No. 621,489**
**Int. Cl.[5] G09G *1/04;* H01J *29/58***
**U.S. Cl. 315—382** **15 Claims**

1. For use in a cathode ray tube display having a display screen, an electron beam source directed at the display screen, horizontal and vertical deflection systems for producing respective horizontal and vertical deflection signals, a vertical and horizontal deflection yoke for receiving the deflection signals and for scanning the electron beam across the screen and a focus electrode for receiving a focus signal used to focus the electron beam, a focus system comprising:

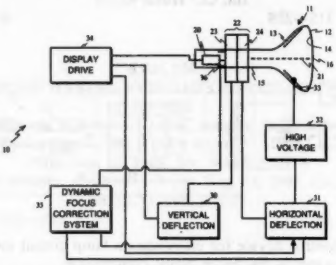
a clamp circuit having a first terminal coupled to the focus electrode and a second terminal;

a source of DC potential coupled to said second terminal;

a source of vertical deflection rate parabolic signals;

a source of horizontal deflection rate parabolic signals;

a composite signal amplifier having an input coupled to said sources of vertical and horizontal deflection rate parabolic




signals and an output coupled to said first terminal of said clamp circuit; and

a vertical signal amplifier having an input coupled to said source of vertical deflection rate parabolic signals and an output coupled to said second terminal of said clamp circuit.

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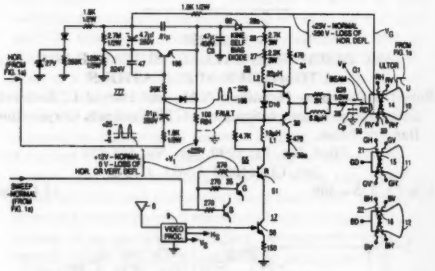
**5,036,260**

## SELF BIASING PROTECTION ARRANGEMENT FOR A CATHODE RAY TUBE

**John B. George, Carmel, Ind., assignor to Thomson Consumer Electronics, Inc., Indianapolis, Ind.**

**Filed Apr. 30, 1990, Ser. No. 516,386**
**Int. Cl.[5] G09G *1/04;* H01J *29/52***
**U.S. Cl. 315—384** **17 Claims**



1. A video display apparatus, comprising:

a cathode ray tube having a cathode electrode and a high voltage electrode;

a source of a high voltage coupled to said high voltage electrode of said cathode ray tube for producing a beam current that flows as a cathode electrode current in said cathode electrode;

a source of a supply, second voltage;

a video amplifier having an input supply terminal to receive thereat said second voltage that energizes said video amplifier for generating a cathode electrode voltage at said cathode electrode from said second voltage when said second voltage is at a nominal level;

first means for generating a control signal that is coupled to said video amplifier to disable said video amplifier when blanking of said beam current is required; and

second means responsive to said second voltage for developing, in accordance with said second voltage, an impedance having a high value at said input supply terminal when

said second voltage is substantially different from said nominal level to provide the beam current blanking.

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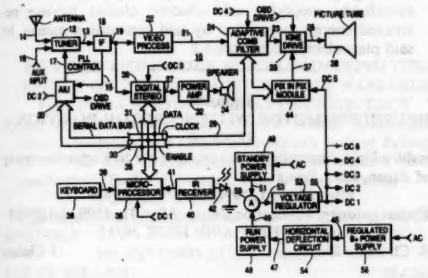
## 5,036,261
## STANDBY/RUN POWER SUPPLY AND CONTROL CIRCUIT

William J. Testin, Indianapolis, Ind., assignor to Thomson Consumer Electronics, Inc., Indianapolis, Ind.

Filed Aug. 11, 1989, Ser. No. 392,311
Int. Cl.[5] H01J 29/70; H04N 5/63
U.S. Cl. 315—411 29 Claims




1. A combined standby/run power supply and control circuit for a television apparatus, comprising:

means for generating a standby source of DC voltage when said apparatus is coupled to an AC power source;

means for generating a run source of DC voltage;

two interconnected CMOS integrated circuits coupled to a common reference potential and having respective supply voltage inputs, one of said integrated circuits being active in both standby and run modes of operation and the other of said integrated circuits being active only in said run mode; and,

regulating means, having an input coupled to both said standby and run sources of DC voltage and having an output coupled to said respective supply voltage inputs, for generating a regulated supply voltage from said standby source during said standby mode and from said run source during said run mode, for energizing said interconnected CMOS integrated circuits at substantially the same supply voltage level during said run mode.

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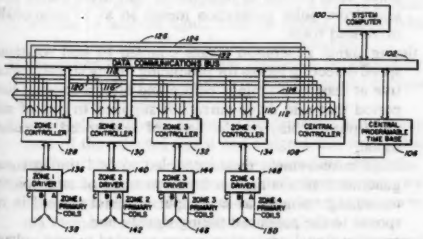
## 5,036,262
## METHOD OF DETERMINING CONTROL INSTRUCTIONS

Dave I. Schonbach, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sep. 13, 1989, Ser. No. 406,653
Int. Cl.[5] H02K 41/03
U.S. Cl. 318—38 9 Claims




1. A method of providing steady state data for continuously propelling multiple, synchronous, linear motor secondaries from a closely spaced, initial speed condition to a spaced apart, final speed condition along a linear motor primary having teeth electrically divided into zones for control, comprising the steps of:

defining a motion profile for a steady state condition for the secondaries moving along the linear motor primary;

selecting the number of data output intervals desired between secondaries entering the primary and providing a memory address array in a zone controller memory, the number of addresses in the array equal to the desired number of intervals;

generating a table of data describing the motion profile in terms of time versus position instructions defined as the time in the data output intervals for a secondary to reach each tooth along the primary;

performing a modulo operation on the data output intervals when the secondary enters each zone to generate for each zone an entry address in the array of memory addresses to locate the data point where the secondary reaches a first tooth in that zone according to the defined motion profile;

mapping the remaining time versus position instructions onto the memory address array after the start address one for one;

determining for each time interval in the data output intervals, a bit pattern to control the energizing of each zone to accomplish the secondary motion profile;

storing the bit patterns in the address locations in the zone controller memories;

simultaneously addressing all zone controller memories and outputting the stored bit patterns for controlling each of the zones so that each secondary follows the defined motion profile as it moves along the zones of the primary.

3. A method of providing transition data for continuously propelling multiple, synchronous, linear motor secondaries from a first steady state operation to a second different steady state operation where the secondaries in each steady state are traveling at a closely spaced, initial speed condition to a spaced apart, final speed condition along a linear motor primary having teeth electrically divided into zones for control, comprising the steps of:

defining a first and second steady state motion profiles for the secondaries moving along the linear motor primary;

generating a table of data describing the first and second steady state motion profiles in terms of time versus position defined as the time in data output intervals for a secondary to reach each tooth along the primary;

selecting a common mathematical method for representing the steady state motion profiles and a set of transition motion profiles defining the motion of all secondaries moving along the primary during the transition operation, each transition profile being a function of the steady state profiles and being proportionately distributed between them, the proportion determined by a weighting function;

determining for each time interval in the data output intervals, a bit pattern to control the energizing of each zone to accomplish the secondary motion profiles;

storing the bit patterns in address locations in zone controller memories;

simultaneously addressing all zone controller memories containing the first steady state motion profiles and outputting the stored bit patterns for controlling each of the zones so that each secondary follows the first steady state motion profiles;

terminating the addressing of all zone controller memories containing the first steady state motion profile and simultaneously addressing all zone controller memories containing the transition motion profiles and outputting the stored bit patterns for controlling each of the zones so that each secondary moving along the primary during the transition operation follows the transition motion profiles for that secondary;

terminating the addressing of all zone controller memories containing transition motion profiles and simultaneously addressing all zone controller memories containing the

second steady state motion profiles and outputting the stored bit patterns for controlling each of the zones so that each secondary follows the second steady state motion profiles.

9. A method of determining control data for propelling multiple, synchronous linear motor secondaries along a primary having teeth and electrically divided into zones for control, wherein the secondaries are transitioning over a designated time from a first steady state motion profile to a second different steady state motion profile and wherein each secondary affected by the transition operation follows a particular transition profile somewhere between the steady state profiles, comprising the steps of:

defining the first steady state profile for the secondary in terms of values of the time in data output intervals that it takes the secondary to reach each tooth;

defining the second steady state profile for the secondary in terms of values of the time in the data output intervals that it takes the secondary to reach each primary tooth;

defining a particular transition profile for each secondary affected by the transition operation by slipping the data from the first profile to the second profile based on a time weighting function comparing, at each tooth, a time related variable for the particular secondary to the corresponding time related expression for the designated transition time, the time weighting function having a value between zero and one and being continuous and non-decreasing for increasing time over the time for transition.

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**5,036,263**

## PIEZOELECTRIC ACTUATOR DRIVING APPARATUS

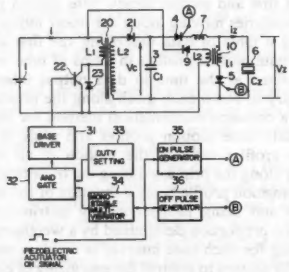
**Yasufumi Yamada, Okazaki; Yasutaka Nakamori, Anjo; Kiyomitsu Kozawa, Nagoya, and Yoshimi Natsume, Toyokawa, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Nov. 7, 1989, Ser. No. 432,677**

**Claims priority, application Japan, Nov. 9, 1988, 63-283394**

**Int. Cl.[5] H01L** *41/08*

**U.S. Cl. 318—116** **6 Claims**




1. An apparatus for driving a piezoelectric actuator, comprising:

a charging route for selectively supplying electric charge to a piezoelectric actuator so as to cause expansion of said piezoelectric actuator;

a charging transformer having its primary winding connected to a power source and its secondary winding which is excited by said primary winding, connected to said charging route, so that magnetic energy stored in said primary winding induces a voltage in said secondary winding;

a controllable switching element connected between said primary winding of said transformer and said power source so as to controllably connect and disconnect said primary winding to said power source;

drive means for driving said switching element to connect and disconnect said primary winding to said power source according to a plurality of pulse signals so that when said switching element is driven according to said pulse signals, said primary winding causes magnetic energy stored therein to induce a voltage in said secondary winding at predetermined timings of said pulse signals;

a capacitor connected to said charging route and in parallel with said secondary winding of said charging transformer so as to be charged with electric charge by said voltage induced in said secondary winding;

controlling means, coupled to said drive means, for controlling pulses of said drive means to control a total amount of energy of said electric charge to be supplied to said capacitor, based on a desired amount of energy to be supplied to said piezoelectric actuator; and

said charging route including charge supplying means for switchably supplying said electric charge having restricted energy, controlled by said controlling means, to said piezoelectric actuator.

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**5,036,264**

## BRUSHLESS MOTOR WITH NO ROTOR-POSITION SENSOR

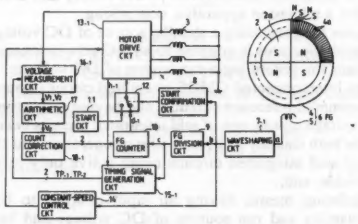
**Yasuhiro Ueki, Sagamihara, Japan, assignor to Victor Company of Japan, Ltd., Japan**

**Filed May 31, 1990, Ser. No. 531,489**

**Claims priority, application Japan, May 31, 1989, 1-139560**

**Int. Cl.[5] H02P** *6/02;* **H02K** *29/12*

**U.S. Cl. 318—254** **3 Claims**




1. A brushless motor including a rotor having a plurality of first magnet poles of successively alternating polarities and a plurality of second magnetic poles of successively alternating polarities and a stator having a plurality of multi-phase drive coils provided in connection with said first magnet poles of said rotor to generate a rotational torque with respect to said rotor, comprising:

rotational speed detecting means provided in conjunction with said plurality of second magnetic poles of said rotor for detecting a rotational speed of said rotor and generating a speed detection signal indicative of the detected rotational speed;

drive pulse generation means coupled to said rotational speed detecting means for generating drive pulses in accordance with said speed detection signal;

motor drive means coupled to said multi-phase coils of said stator for supplying drive current in shifts to said multi-phase coils thereof in response to said drive pulses from said drive pulse generation means so as to rotationally drive said rotor;

timing signal generation means coupled to said rotational speed detecting means for producing timing signals indicative at least two timings before and after a flowing time period that said drive current is supplied to one of said multi-phase coils, on the basis of said speed detection signal;

voltage measurement means coupled to said timing signal generation means and an input terminal of said coil for measuring voltages at said input terminal thereof in response to the produced timing signals; and

correction signal generation means coupled to said voltage measurement means and said drive pulse generation means for producing a correction signal on the basis of the volt-

age values measured by said voltage measurement means, the produced correction signal being supplied to said drive pulse generation means so as to correct the timing of generation of said drive pulses on the basis of the produced correction signal.

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## 5,036,265

## METHOD AND DEVICE FOR ELIMINATING THE EFFECT OF PERIODIC DISTURBANCE VARIABLE HAVING A KNOWN, VARIABLE FREQUENCY

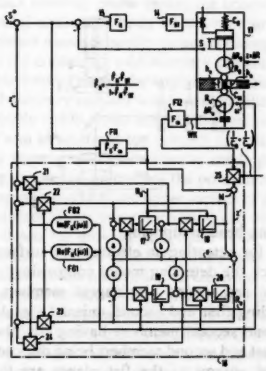
**Georg Weihrich, Uttenreuth; Dietrich Wohld, Brüuningshof; Martin Niemann, and Clemens Jungkunz, both of Erlangen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed Jul. 6, 1990, Ser. No. 549,358**

**Claims priority, application European Pat. Off., Jul. 10, 1989, 89112580.9**

**Int. Cl.[5] G05D *23/275*; G05B *13/04***

**U.S. Cl. 318—618** **20 Claims**



1. A method for eliminating effects of periodic disturbance variables having a known, variable frequency, affecting control loops between a final controlling element and a controlled system, said method comprising the steps of:

a) obtaining a first signal from a first splitoff point before a point of application of the disturbance variable;

b) obtaining a second signal from a second splitoff point after the point of application of the disturbance variable;

c) feeding the first and second signals to a mixing element;

d) selecting a selected signal from the mixing element which is a function only of the disturbance variable;

e) generating real and imaginary frequency dependent parts of a dimensioned complex correction frequency operation in a correcting element;

f) amplitude-weighting at least a fundamental wave component of the selected signal and a signal that is 90° phase-leading the selected signal in the correcting element;

g) summing the amplitude-weighted fundamental wave component and the 90° phase-leading signal in the correcting element to obtain a summed signal; and

h) applying the summed signal either to compensate for disturbance variables before the first splitoff point, or to blank out disturbance variables after the second splitoff.

## 5,036,266

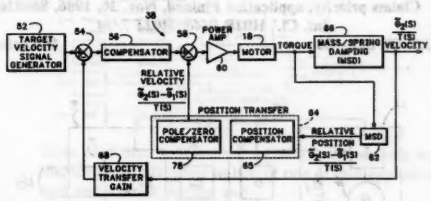
## MASS VELOCITY CONTROLLER

**Edward F. Burke, Lake Oswego, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.**

**Continuation-in-part of Ser. No. 297,202, Jan. 17, 1989. This application Mar. 30, 1990, Ser. No. 502,379**

**Int. Cl.[5] G05B *15/00***

**U.S. Cl. 318—646** **20 Claims**




1. A system for monitoring the movement of a mass driven by a flexible element comprising:

a mass moveable along a predetermined path;

a flexible element coupled to the mass;

a motor for driving the flexible element and thereby the mass along a predetermined path;

a transducer mounted on the mass and in communication with the flexible element capable of detecting a physical characteristic of the flexible element representative of velocity of the mass relative to velocity of the motor; and

means for generating a relative velocity signal therefrom.

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## 5,036,267

## AIRCRAFT TURBINE START FROM A LOW VOLTAGE BATTERY

**Albert L. Markunas, Roscoe, and Gregory I. Rozman, Rockford, both of Ill., assignors to Sundstrand Corporation, Rockford, Ill.**

**Filed Dec. 15, 1989, Ser. No. 451,447**

**Int. Cl.[5] F02N *11/00***

**U.S. Cl. 322—10** **7 Claims**

1. A system for starting an aircraft turbine from a low voltage power supply by energizing a generator coupled to said turbine to operate as a motor during starting, comprising in combination:

an inverter having a direct current input coupled to said low voltage battery and an alternating current output;

an autotransformer having a starting mode input tap and a starting mode output tap, said autotransformer coupling a stepped up voltage between said input tap and output tap;

means for coupling said output tap to said generator;

control means for coupling said inverter output to said generator initially during starting and thereafter coupling said inverter output to said transformer input tap; and

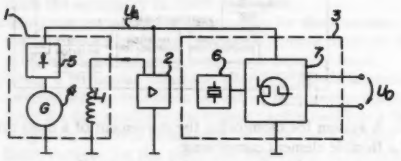
means for controlling the input current to said generator to maintain the battery terminal voltage during starting at a predetermined level.

5,036,268

## PROCEDURE AND APPARATUS FOR PRODUCING AN A.C. VOLTAGE

Matti Lahtinen, Espoo, and Ismo Pyörre, Märynummi, both of Finland, assignors to Dynawatt Oy, Helsinki, Finland

PCT No. PCT/FI87/00156, § 371 Date Jun. 23, 1989, § 102(e) Date Jun. 23, 1989, PCT Pub. No. WO88/04113, PCT Pub. Date Jun. 2, 1988
Continuation of Ser. No. 368,374, Jun. 23, 1989, abandoned.
This PCT application Nov. 18, 1987, Ser. No. 616,721
Claims priority, application Finland, Nov. 26, 1986, 864826
Int. Cl.[5] H02P *9/48;* H02J *7/14*
U.S. Cl. 322—28 10 Claims



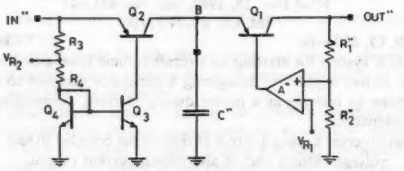
1. Apparatus for producing an a.c. voltage, comprising:
an a.c. generator for producing a first a.c. voltage, rectifier means for rectifying said a.c. voltage to produce as an output a d.c. voltage, inverter means for inverting said d.c. voltage to produce as an output a second a.c. voltage, said second a.c. voltage having a substantially constant frequency and a substantially constant maximum amplitude and being independent from a rotational velocity of said a.c. generator, control means for stabilizing said d.c. voltage to be substantially constant by measuring said d.c. voltage and regulating magnetization of said a.c. generator so that the amplitude of said second a.c. voltage is regulated, wherein said inverter means includes oscillator means for stabilizing the frequency of said second a.c. voltage so that it is formed separately from the amplitude of said second a.c. voltage.

5,036,269

## VOLTAGE STABILIZER WITH A VERY LOW VOLTAGE DROP DESIGNED TO WITHSTAND HIGH VOLTAGE TRANSIENTS

Bruno Murari, Monza; Marco Morelli, Leghorn, and Giampietro Maggioni, Cornaredo, all of Italy, assignors to SGS-Thomson Microelectronics Srl, Brianza, Italy

Filed Dec. 28, 1989, Ser. No. 458,373
Claims priority, application Italy, Dec. 28, 1988, 23114 A/88
Int. Cl.[5] G05F *1/55*
U.S. Cl. 323—266 5 Claims



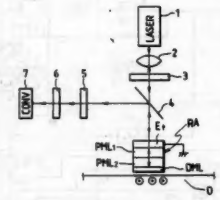

1. A monolithically integratable voltage stabilizer comprising:
a first bipolar transistor of a first type of conductivity having an emitter terminal which is connected to ground via a capacitor, and having a collector terminal which forms an output terminal of the stabilizer, and having a base terminal;
a differential amplifier having an output terminal which is connected to said base terminal of said first bipolar transistor and having a first input terminal which is connected to a voltage divider connected between said output terminal of the stabilizer and ground, and having a second input terminal which is connected to a first voltage reference;
a second bipolar transistor of said first type of conductivity having an emitter terminal which forms an input terminal of the stabilizer, and having a collector terminal which is connected to said emitter terminal of said first transistor and having a base terminal which is connected to a biasing and switching circuit means disposed between said base terminal of said second transistor and ground and said input terminal of the stabilizer.

5,036,270

## APPARATUS FOR DETECTING ELECTROSTATIC SURFACE POTENTIAL

Itsuo Takanashi, Kamakura; Shintaro Nakagaki, Fujisawa; Hirohiko Shinonaga; Tsutou Asakura, both of Yokohama, and Masato Furuya, Yokosuka, all of Japan, assignors to Victor Company of Japan, Ltd., Japan

Filed Aug. 15, 1989, Ser. No. 394,040
Int. Cl.[5] G01R *33/032, 31/00*
U.S. Cl. 324—96 14 Claims




1. A sensing head comprising:
(a) means for detecting an electrostatic surface potential of an object, the detecting means comprising:
(a1) first and second birefringent members respectively including first and second uniaxial signal crystals, the first and second members having flat planar surfaces, the first and second members being disposed in a path of optical energy so the flat planes are in confronting relation with each other so that the first and second members are stacked with respect to the plane, the first member having an input surface via which the optical energy enters the first member, the second member having an output surface via which the optical energy exits from the second member; and
(a2) electric field formation means for applying an electric field to at least one of the first and second members, the applied electric field being controlled in response to the electrostatic surface potential of the object;
the birefringent members being located and arranged such that the crystal axes of the first and second members are mirror-symmetrical to each other with respect to the flat plane of the opposed birefringent member so that (i) the optical energy incident on the input surface separates into an ordinary ray and an extraordinary ray after the optical energy enters the first member via the input surface, and (ii) the ordinary ray and the extraordinary ray proceed along different paths respectively in first and second members to which the electric field is applied, and (iii) the ordinary ray and the extraordinary ray meet together where the ordinary ray and the extraordinary ray exit from the second member via the output surface.

5,036,271

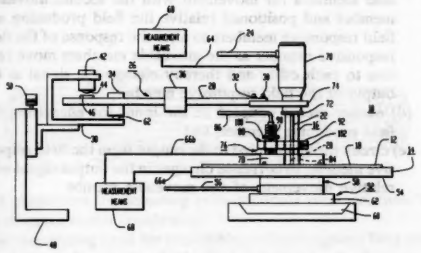
## APPARATUS FOR CHARACTERIZATION OF ELECTRICAL PROPERTIES OF A SEMICONDUCTOR BODY

Robert G. Mazur, Sewickley; Robert C. Stephenson, North Irwin, and Donald A. Zier, Jr., Coraopolis, all of Pa., assignors to Solid State Measurements, Inc., Pittsburgh, Pa.

Filed May 23, 1990, Ser. No. 527,790

Int. Cl.[5] G01R *31/02, 31/22*

U.S. Cl. 324—158 P 5 Claims



1. An apparatus for measurement of electrical properties of semiconductor wafer body, said apparatus comprising:

means for supporting said semiconductor wafer body in predetermined position;

top contact mercury probe means for contacting the upper surface of said wafer body with a mercury column, said top contact mercury probe means including capillary tube means for containing said mercury column;

pneumatic control means for applying a vacuum or pressure to said mercury column within said capillary tube means;

kinematically stable probe arm position means comprising a probe arm having said top contact mercury probe means affixed thereto, said kinematically stable probe arm positioning means for controlling the position of said capillary tube means relative to the upper surface of aid wafer body;

semiconductor wafer body horizontal and rotational movement means for moving said wafer body rotationally or horizontally relative to said capillary tube means;

measurement means for causing an electrical current to flow through said semiconductor wafer body and for measuring resultant electrical properties of said wafer body;

first electrical contact means connected in circuit with said memory column and said measurement means;

second electrical contact means for providing a path for current flow between said measurement means and said wafer body; said measurement means connected in circuit with said first electrical contact means, said second electrical contact means and said wafer body.

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5,036,272

## PLURAL TEST MODE SELECTION CIRCUIT

Sung-Hee Cho; Jae-Young Do, both of Seoul, and Jin-Ki Kim, Daegu, all of Rep. of Korea, assignors to SamSung Electronics Co., Ltd., Kyung Ki-Do, Rep. of Korea

Filed May 30, 1989, Ser. No. 357,989

Claims priority, application Rep. of Korea, Dec. 14, 1988, 1988-16648

Int. Cl.[5] G01R *15/12*

U.S. Cl. 324—158 R 12 Claims

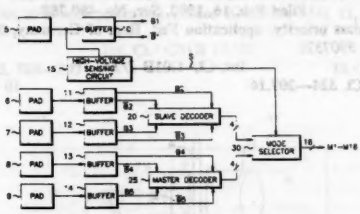
1. A method of selecting a test mode from a plurality of options, comprising the steps of:

buffering applied control and address signals to produce a plurality of normal and inverted output signals;

producing a sub-mode signal by decoding a first set of selected said normal and inverted output signals using a first decoder;

producing a main-mode signal a second and different set of selected said normal and inverted output signals using a second decoder;

enabling a selection from among a plurality of operational modes based on combinations of output signals received



from said first and second decoders, in response to an enabling signal applied in lieu of one of said applied control and address signals; and

choosing a mode based on the main-mode and sub-mode signals while enabling said selection.

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5,036,273

## SYSTEM OF MEASURING A STATE DENSITY IN A SEMI-CONDUCTOR ELEMENT AND A METHOD USING THIS SYSTEM

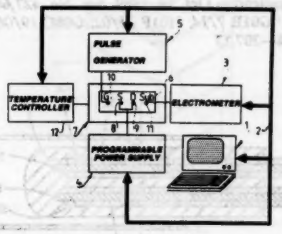
Guido V. L. Groeseneken, Leuven, and Herman E. M. Maes, Bierbeek, both of Belgium, assignors to Interuniversitair Micro-Elektronica Centrum, Leuven-Heverlee, Belgium

Filed Oct. 3, 1988, Ser. No. 252,130

Claims priority, application Netherlands, Oct. 5, 1987, 8702373

Int. Cl.[5] G01R *31/26*

U.S. Cl. 324—158 T 5 Claims



1. A system of measuring state density in a semi-conductor element, e.g. a MOS-transistor, provided with connecting terminals, comprising:

a pulse generator for generating pulses to be applied to the connecting terminals;

an electrometer for measuring change induced in the semiconductor element by said pulses;

a control unit to control the size and shape of said pulses and in which a charge value measured by said electrometer is convertible by said control unit into a measure of the state density of said semi-conductor element.

5,036,274

## METHOD OF MONITORING THE PATH OF AN ANNULAR BLADE THROUGH A SEMICONDUCTOR MATERIAL

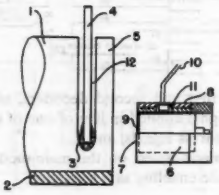
Helmut Seeburger, Robert-Koch-Strasse 152, 8263 Burghausen, Fed. Rep. of Germany

Filed Feb. 16, 1990, Ser. No. 480,758

Claims priority, application Fed. Rep. of Germany, Mar. 3, 1989, 3907321

Int. Cl.[5] G01B 7/14

U.S. Cl. 324—207.16 10 Claims




1. An eddy-current sensor for monitoring the path of a cut when sawing semi-conductor material into wafers with an annular saw blade, said sensor comprising:

an eddy-current sensor means; and

a cover made of semiconductor material secured to said eddy-current sensor means on a side thereof facing the saw blade.

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5,036,275

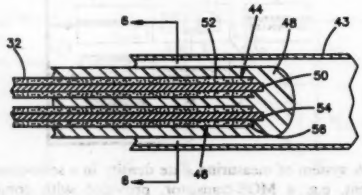
## INDUCTIVE COUPLING POSITION SENSOR METHOD AND APPARATUS HAVING PRIMARY AND SECONDARY WINDINGS PARALLEL TO EACH OTHER

Carl A. Munch, Reed City; Stephen R. W. Cooper, Tustin, and Michael J. Rymut, Cadillac, all of Mich., assignors to Nartron Corporation, Reed City, Mich.

Continuation-in-part of Ser. No. 296,183, Jan. 11, 1989. This application Oct. 26, 1989, Ser. No. 427,641

Int. Cl.[5] G01B 7/14; H01F 21/02; G08C 19/06, 19/12

U.S. Cl. 324—207.17 27 Claims




1. Position sensing apparatus for monitoring a relative position between two relatively moveable members comprising:

(a) an elongated field producing member coupled to a first of said moveable members and including a first multiturn conductor wound about a field producing member axis having a first controlled turn density, and an input for energizing the first multiturn conductor to produce an electromagnetic field in the vicinity of the field producing member;

(b) an elongated field responsive member fixed with respect to the field producing member including a second multiturn conductor wound about a field responsive member axis having a second controlled turn density, said elongated field responsive member oriented in side by side, generally parallel orientation to the elongated field producing member along a length of the field producing member, and having an output for providing an output signal in response to the electromagnetic field produced by the field producing member;

(c) a coupling member connected to a second of the moveable members for movement with the second moveable member and positioned relative the field producing and field responsive members to alter the response of the field responsive member as the moveable members move relative to each other and thereby change the signal at the output of the field responsive member;

(d) exciter means coupled to the input for energizing the field producing member; and

(e) circuit means coupled to the output from the field responsive member to correlate changes in the output signal with relative movement of the moveable membe

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5,036,276

## MAGNETIC ENCODER WITH HIGH RESOLUTION OF DATA SIGNAL RECORDING AT REDUCED RECORDING PITCH

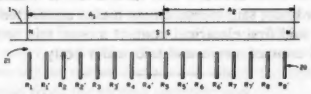
Hitomi Aizawa, Suwa, Japan, assignor to Seiko Epson Corporation, Japan

Filed Apr. 4, 1990, Ser. No. 504,590

Claims priority, application Japan, Apr. 5, 1989, 1-85902

Int. Cl.[5] G01B 7/14, 7/00; G06K 7/08; G11B 5/39

U.S. Cl. 324—207.21 5 Claims



1. A magnetic encoder comprising a sensor having a plurality of MR elements placed in juxtaposed position relative to a magnetic recording medium upon which data signals are recorded at a recording pitch, A, and wherein output signals are derived from said MR elements from the relative movement between said sensor and said recording medium, the improvement in said encoder comprising:

2n MR elements positioned at A/n intervals over two recording pitches, $A_1$ and $A_2$, relative to said recording medium recording pitch, A, wherein n is an integer and $n \geqq 8$,

said MR elements coupled into n/2 bridge circuits to produce n/2 multiphase output signals, and

a multiplier circuit is connected to receive said multiphase output signals to produce resultant phase shifted output signals derived from said multiphase output signals corresponding to a duty cycle of A/N wherein N is an integer and $N \geqq 2$.

5,036,277

## METHOD OF AND APPARATUS FOR DETECTING CROSS SECTIONAL AREA VARIATIONS IN AN ELONGATE OBJECT BY THE NON-INDUCTIVE MEASUREMENT OF RADIAL FLUX VARIATIONS

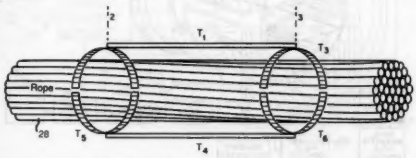
Nicolaas T. van der Walt, Johannesburg, South Africa, assignor to Crucible Societe Anonyme, Gerondins, Luxembourg

Filed Nov. 18, 1988, Ser. No. 273,269

Claims priority, application South Africa, Nov. 23, 1987, 87/8754

Int. Cl.[5] G01N *27/82, 27/72;* G01R *33/12*

U.S. Cl. 324—235 11 Claims




1. Apparatus for detecting cross-sectional area variations in an elongate object comprising:

a magnetizing head for establishing a first magnetic field and a second magnetic field which is adjacent the first magnetic field; the first and second magnetic fields being directed respectively in opposing senses,

means for forming a pathway for the object which permits the object to travel in an axial direction through the first magnetic field and through the second magnetic field so that the object is magnetized in opposing axial directions by the first and second magnetic fields, respectively,

a plurality of non-inductive transducers for detecting variations in radial flux from or to the object, two of the transducers positioned on diametrically opposed sides of the elongate object being arranged so that they extend along a longitudinal axis of the object and being interconnected to produce a composite signal, and

means for comparing the composite signal to a reference signal, the transducers extending axially from within the magnetizing head at a first position at which the first magnetic field is at a maximum, to a second position outside the magnetizing head at which the net magnetic field from the sum of the first and second magnetic fields is zero.

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5,036,278

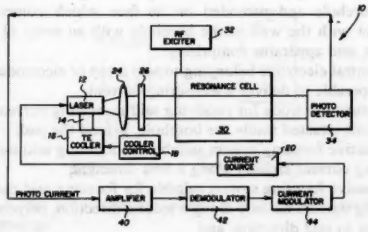
## RADIATION SOURCE FOR HELIUM MAGNETOMETERS

Robert E. Slocum, Richardson, Tex., assignor to Polatomic, Inc., Richardson, Tex.

Filed Sep. 29, 1989, Ser. No. 414,909

Int. Cl.[5] G01R *33/26*

U.S. Cl. 324—304 13 Claims




5. The helium magnetometer of claim 4 wherein said semiconductor chip includes at least one diode emitter.

5,036,279

## PORTABLE NMR AND NQR SPECTROMETERS

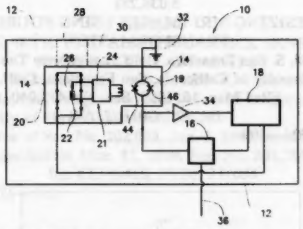
Paul Jonsen, London, England, assignor to Datalight Limited, Hong Kong

Continuation of Ser. No. 192,344, May 11, 1988, abandoned. This application May 4, 1989, Ser. No. 366,868

Claims priority, application United Kingdom, May 11, 1987, 8711114

Int. Cl.[5] G01R *33/20*

U.S. Cl. 324—307 18 Claims



1. A spectrometer which operates at liquid nitrogen temperatures comprising:

a portable box constituting faraday shielding for said spectrometer;

a container to hold a liquid nitrogen cryogen, wherein said container is situated within the confines of said box; and

a high temperature direct current superconducting quantum interference device (SQUID) made from mixed oxides of a Lanthanide, copper and barium, wherein said SQUID is also situated within the confines of said box.

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5,036,280

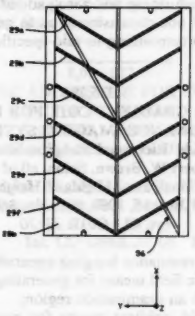
## PHANTOM FOR MAGNETIC RESONANCE IMAGING SYSTEM

Jay A. Chesavage, Palo Alto, Calif., assignor to MRI Technologies, Mountain View, Calif.

Filed Feb. 13, 1990, Ser. No. 479,389

Int. Cl.[5] G01V *3/00*

U.S. Cl. 324—308 15 Claims



1. A phantom for measuring the performance of a magnetic resonance imaging (MRI) system having a predetermined slice thickness where the slice is in a YZ plane and the thickness is along an X-axis, said XYZ axes being a three dimensional orthogonal system, said phantom comprising:

an elongated hollow enclosure with an elongate axis parallel to said X-axis for insertion in an MRI system and for retaining a fluid to which said MRI system is relatively more sensitive than said enclosure material;

means positioned in said enclosure for measuring said slice thickness, including a plate-like structure substantially

parallel to said X-axis, fastened within said enclosure, and having a plurality of elongate channels, each channel having a common and predetermined width smaller than said slice thickness in which said fluid may circulate, the elongate axis of each channel being parallel to the plane of said slice, and said axis of each of said plurality of channels also lying in a substantially diagonal plane extending from the front of said slice to its rear, whereby the number of channels appearing in an MRI slice image is indicative of slice thickness.

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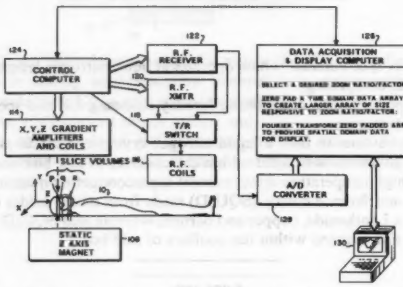
**5,036,281**

## RESIZING MRI IMAGES USING FOURIER TRANSFORMATION

**Jianhua Li, S. San Francisco, Calif., assignor to The Regents of the University of California, San Francisco, Calif.**

**Filed Mar. 16, 1990, Ser. No. 495,040**
**Int. Cl.[5] G01R *33/20***
**U.S. Cl. 324—309** **21 Claims**




1. In a nuclear magnetic resonance imaging system of the type which acquires a time domain data set representing NMR responses and transforms said time domain data set to spatial domain data for imaging purposes, an improved image resizing method including the following steps:

(a) specifying a desired zoom factor;

(b) zero padding said time domain data set, including the step of selecting the quantity of padded zeros in response to said zoom factor; and

(c) Fourier transforming said zero padded time domain data set in at least one dimension so as to generate spatial domain data corresponding to said specified zoom factor.

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**5,036,282**

## BIPLANAR GRADIENT COIL FOR MAGNETIC RESONANCE IMAGING SYSTEMS

**Michael A. Morich, Richmond Heights; Michael A. Martens, Euclid, and Robert W. Brown, Solon, all of Ohio, assignors to Picker International, Inc., Highland Heights, Ohio**

**Filed Jun. 16, 1989, Ser. No. 368,047**
**Int. Cl.[5] G01R *33/20***
**U.S. Cl. 324—318** **19 Claims**

1. A magnetic resonance imaging apparatus comprising:

a main magnetic field means for generating a main magnetic field through an examination region;

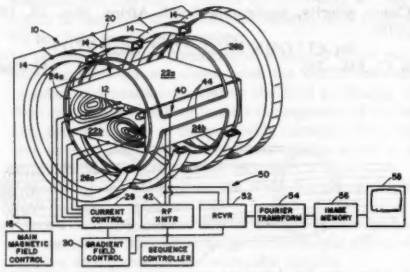
a magnetic field gradient means for generating magnetic field gradients across the examination region, the gradient magnetic field means including:

first and second coil loop arrays disposed symmetrically to each other about a line of symmetry and along a planar surface,

third and fourth coil loop arrays disposed symmetrically about the line of symmetry and between the first and second coil loop arrays along the planar surface,

a current supply means for supplying an electric current to the coil loop arrays such that the first and fourth coil loop arrays have a net clockwise current flow and the second and third coil loop arrays have a net counterclockwise current flow;

a magnetic resonance excitation means for selectively exciting magnetic resonance of dipoles disposed in the examination region;




magnetic resonance signal receiving means for receiving magnetic resonance signals from the resonating dipoles; and,

a reconstruction means for reconstructing an image representation from the magnetic resonance signals.

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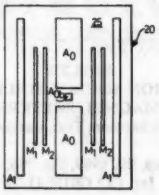
**5,036,283**

## METHOD AND APPARATUS FOR MEASURING THE RESISTIVITY OF EARTH FORMATIONS USING ANTI-PARALLEL ACTIVE AND PASSIVE FOCUSSING ELECTRODES

**Jean-Claude Trouiller, Saint-Rémy-lès-Chevreuse, and Marie-Therese Gounot, Le Vésinet, both of France, assignors to Schlumberger Technology Corporation, New York, N.Y.**

**Filed Feb. 20, 1990, Ser. No. 483,039**
**Claims priority, application France, Feb. 20, 1989, 89 02158**
**Int. Cl.[5] G01V *3/20***
**U.S. Cl. 324—375** **28 Claims**




15. A logging apparatus for determining the electrical resistivity of an earth formation traversed by a borehole, comprising a measuring pad adapted to be pressed against the wall of the borehole and provided on its face which comes into contact with the wall of the borehole with an array of electrodes, said apparatus comprising:

a central electrode belonging to said array of electrodes and operable to deliver a measuring current;

a return electrode for receiving said measuring current in a zone situated inside the borehole, behind the pad;

an active focusing system suitable for focusing said measuring current radially along a first direction;

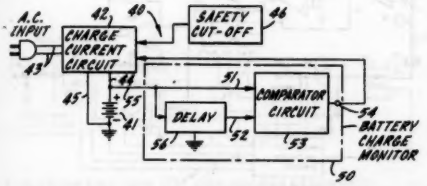
a passive focusing system suitable for focusing said measuring current radially along a second direction, perpendicular to said direction; and

means for measuring the value of the measuring current in order to determine the resistivity of the formation.

## 5,036,284
## MONITOR CIRCUITS FOR BATTERY CHARGING AND OTHER APPLICATIONS

Frank J. Cichanski, 904 Duncan Ave., Elgin, Ill. 60120

Filed Jan. 16, 1990, Ser. No. 465,378
Int. Cl.[5] G01N 27/46
U.S. Cl. 324—433 28 Claims




1. A charge monitor circuit for monitoring variations in the terminal voltage of an electrical energy storage device comprising one or more storage cells in order to control charging of the storage device from a charge circuit supplying a charging current thereto, at least by interrupting the charging current when the storage device reaches a predetermined state of charge, the monitor circuit comprising:

a main input, connectable to the storage device, for receiving an initial signal indicative of the present terminal voltage of the storage device;

comparator circuit means, having first and second inputs and an output, for comparing two input signals to develop an output signal representative of the relationship between the two input signals;

first connection means for connecting the main input to the first input of the comparator circuit means to apply the initial signal thereto;

delay means for delaying a signal for a predetermined brief time interval;

and second connection means for connecting the main input through the delay means to the second input of the comparator circuit means to apply a delayed initial signal thereto;

the comparator output being connectable to the charge circuit.

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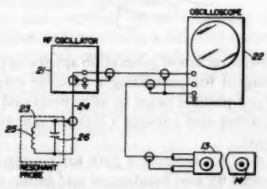
## 5,036,285
## RESONANT PROBE AND RADIO FREQUENCY COUPLER

Clifford O. Shaw, Colorado Springs, Colo., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 6, 1982, Ser. No. 375,435
Int. Cl.[5] G01R 31/06
U.S. Cl. 324—546 11 Claims




1. A test set for testing inductor and stripline assemblies comprising:

a source of radio frequency electrical energy;

a readout device connected to said source of radio frequency electrical energy and adapted to receive output signals from an assembly of stripline mounted inductors connected thereto;

a resonant probe configured to cooperate with inductors mounted on said stripline and having a planar wound coil having inner and outer leads mounted therein; and

a coaxial cable transmission line connecting said resonant probe and said source of radio frequency energy and having a length sufficient to permit said resonant probe to be placed sequentially over said stripline mounted inductors.

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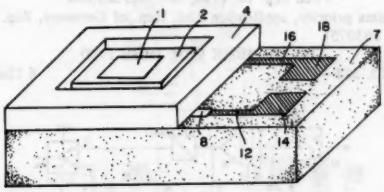
## 5,036,286
## MAGNETIC AND ELECTRIC FORCE SENSING METHOD AND APPARATUS

James W. Holm-Kennedy, and Donald K. Umemoto, both of Honolulu, Hi., assignors to The Research Corporation of the University of Hawaii, Honolulu, Hi.

Continuation of Ser. No. 202,003, Jun. 3, 1988, abandoned. This application Mar. 12, 1990, Ser. No. 501,296
Int. Cl.[5] G01R 27/26, 33/038
U.S. Cl. 324—661 31 Claims




1. A method of measurement of electric and magnetic force comprising: etching a well and a channel within a supporting substrate, mounting a fixed capacitive plate within said well, attaching a dynamic substrate having a membrane portion serving as a displaceable capacitive plate to the supporting substrate, thereby suspending the displaceable capacitive plate portion of the dynamic substrate over the etched well and fixed plate, mounting a field responsive material on the displaceable capacitive plate, such that the membrane is in between the fixed plate and the material, displacing the capacitive plate by a field responsive force vector, transducing the plate thereby displacing the plate and producing an electrical capacitive change and sensing the change.

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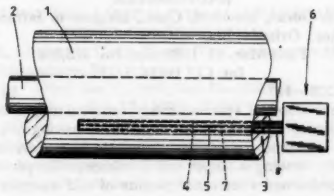
## 5,036,287
## PROCEDURE AND DEVICE FOR CORROSION DETERMINATION

Günter Serwatzky, Grafschaft, Austria, assignor to Dipl.-Ing. Wrede & Niedecken Verwaltung GmbH, Fed. Rep. of Germany

Filed Jan. 31, 1990, Ser. No. 473,049
Claims priority, application Fed. Rep. of Germany, Feb. 17, 1989, 3904894
Int. Cl.[5] G01R 27/08
U.S. Cl. 324—700 21 Claims




1. A procedure for the determination of corrosion preferably

in insulated structural parts, in which there is placed in distant relationship to the outside of the section of the structural part to be monitored for corrosion an electric conducting resistance wire, surrounded by a protective layer, which is also exposed to the corrosive medium—condensation water, for instance—by determining the electric resistance of the resistance wire, whereby the effective cross-section changes in case of corrosion of the resistance wire, so that change in resistance of the resistance wire registers the effect of the corrosive medium, in which the corrosive medium first attacks the protective layer surrounding the resistance wire and gradually, over a period of time, penetrates the protective layer and then attacks the resistance wire itself, in which the retardation of corrosion occasioned by the nature and thickness of the protective layer is chosen in a way to make the retardation of the corrosion correspond to the time required for the corrosion medium to reach the structural part to be examined.

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**5,036,288**

## CIRCUIT ARRANGEMENT FOR CLOCK RECOVERY

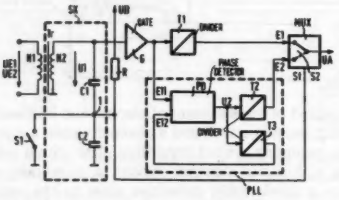
**Hans-Robert Schemmel, Nuremberg, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Sep. 14, 1990, Ser. No. 583,066**

**Claims priority, application Fed. Rep. of Germany, Sep. 14, 1989, 3930751**

**Int. Cl.[5] H03K *9/04;* H03B *1/00***

**U.S. Cl. 328—15** **6 Claims**




1. Circuit arrangement for recovering a clock frequency, characterised in that for alternatively producing a clock frequency output signal (UA) at the output of the arrangement from an input signal comprising either an input data signal (UE1) or an input clock signal (UE2) applied to an input of the arrangement, a tuned circuit (SK) is provided comprising a winding (N2) of a transformer (Tr) at the input of the arrangement and at least one compacitor (C1, C2) connected in parallel with the transformer winding, and means for alternatively coupling said tuned circuit in a first circuit path including a frequency converter (PLL) feeding the output of the arrangement for converting a spectral line (SPO . . . SPN) of the input data signal (UE1) into the clock frequency output signal (UA), or a second circuit path including a first clock divider (T1) feeding the output of the arrangement for converting the input clock signal (UE2) into the clock frequency output signal (UA).

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**5,036,289**

## METHOD AND APPARATUS FOR SYNCHRONOUSLY DEMODULATING DETECTOR OUTPUT OF A RADIOMETER

**Andrew J. Duran, Stamford, Conn., assignor to Infrared Systems, Inc., Orlando, Fla.**

**Filed Mar. 17, 1989, Ser. No. 326,808**

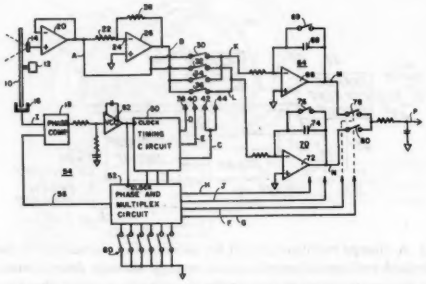
**Int. Cl.[5] H03K *5/22***

**U.S. Cl. 328—117** **10 Claims**

1. The method of synchronously demodulating a detector analog output signal from an instrument having a chopper wherein said detector analog output signal is derived from alternately viewing a target and a reference for providing a target portion and a reference portion of said detector analog output signal comprising the steps of:

amplifying and inverting the analog output from said detector of said instrument for providing a first signal amplified to a predetermined level and a second signal which is inverted with respect to said first signal and amplified to a fraction of the predetermined level of a first signal;

alternately integrating said first and second signals in accordance with a predetermined timing pattern determined by




the alternate integrating rate of said first and second signals for providing peak integrated outputs from each of said first and second signals;

separately sampling, holding, and alternately combining each of said peak integrated outputs of said first and second signals for producing a demodulated output from the instrument.

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**5,036,290**

## SYNCHROTRON RADIATION GENERATION APPARATUS

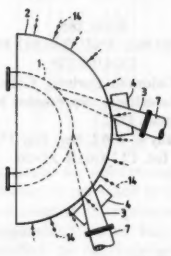
**Tadasi Sonobe, Iwaki; Mamoru Katane; Takashi Ikeguchi, both of Hitachi; Manabu Matsumoto, Ibaraki; Shinjiro Ueda, Abiko; Toshiaki Kobari, Chiyoda; Takao Takahashi, Hitachi; Toa Hayasaka, Atsugi, and Toyoki Kitayama, Isehara, all of Japan, assignors to Hitachi, Ltd. and Nippon Telegraph and Telephone Corp., both of Tokyo, Japan**

**Filed Mar. 8, 1990, Ser. No. 490,450**

**Claims priority, application Japan, Mar. 15, 1989, 1-60979**

**Int. Cl.[5] H05H *13/04;* H01J *7/16***

**U.S. Cl. 328—235** **34 Claims**



1. A synchrotron radiation generation apparatus comprising:

a bending magnet for generating a bending magnetic field for a charged particle beam so as to bend said beam, said bending magnet also causing a leakage magnetic field to be generated;

at least one duct for defining a path for synchrotron radiation generated by said bending of said beam; and

an ion pump connected to said at least one duct, said ion pump having field generation means for generating a main magnetic field for said ion pump;

wherein said field generation means of said ion pump is located such that said main magnetic field is substantially

aligned with a main component of said leakage magnetic field at said ion pump.

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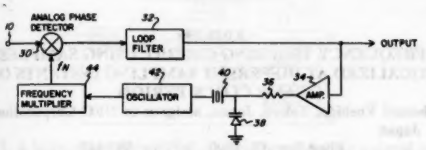
5,036,291

## ON CHANNEL AGILE FM DEMODULATOR

Daniel Marz, Dresher, Pa., assignor to General Instrument Corporation, New York, N.Y.

Filed May 11, 1990, Ser. No. 523,057
Int. Cl.[5] H03D 3/00
U.S. Cl. 329—325 20 Claims




1. A phase lock loop FM demodulator comprising:
a phase detector having a first input for receiving a and of FM signals containing a signal to be demodulated, a second input for receiving a mixing frequency, and an output;
voltage controlled crystal oscillator means for providing a precise and stable output frequency variable over a limited range in response to a control signal derived from said phase detector output; and
frequency multiplier means for multiplying said oscillator frequency by a selected multiplication factor to produce said mixing frequency;
wherein said multiplication factor scales said limited range to produce a proportionate mixing frequency deviation for FM demodulating said signal.

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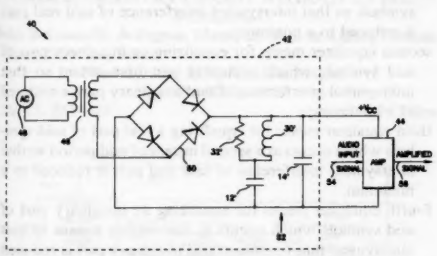
5,036,292

## DECOUPLED ELECTROLYTIC CAPACITOR

John R. Hjelm, Minneapolis, and Richard D. Larson, Eden Prairie, both of Minn., assignors to Audio Research Corporation, Minneapolis, Minn.

Filed Feb. 16, 1990, Ser. No. 480,726
Int. Cl.[5] H03F 3/181
U.S. Cl. 330—202 6 Claims




1. An audio amplifier, comprising:
transformer and rectifier means receiving an AC input power signal and providing a rectified output voltage;
a capacitor network receiving said rectified voltage to provide a DC output signal, said network including an aluminum electrolytic capacitor connected in series with an inductor, said aluminum electrolytic capacitor having a relatively high capacitance and an inherent inductance which degrades its response above a certain frequency, said network further including a bypass capacitor connected to bypass said inductor and said electrolytic capacitor, said bypass capacitor having a relatively small capacitance compared to said electrolytic capacitor and relatively less inherent inductance to provide better high frequency response, said inductor having an inductance which substantially decouples said electrolytic capacitor from said network above a selected frequency so that said bypass capacitor dominates the characteristics of said network above said selected frequency;
amplifier circuit means for receiving an audio input signal and amplifying said signal to provide an amplified audio output signal; and
means for connecting said DC power signal to said amplifier circuit means to provide power thereto.

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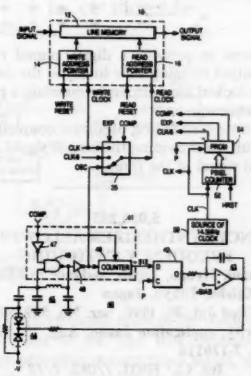
5,036,293

## OSCILLATOR FOR USE WITH VIDEO SIGNAL TIME SCALING APPARATUS

Felix Aschwanden, Thalwil, Switzerland, assignor to RCA Licensing Corporation, Princeton, N.J.

Filed Oct. 19, 1990, Ser. No. 600,635
Int. Cl.[5] H03L 7/08, 7/083; H04N 7/12
U.S. Cl. 331—1 9 Claims




1. Apparatus for time scaling a video signal, comprising:
memory means having an input for receiving said video signal, an output for providing a time scaled video signal, a first clock input for receiving a first clock signal to determine a first rate at which said video signal is written into said memory means, a second clock input for receiving a second clock signal to determine a second rate at which said video signal is read out of said memory means, in time scaled form;
an oscillator for producing said second clock signal during a time scaling interval and having a frequency control input;
means for generating a reference signal at a predetermined time within of said time scaling interval;
phase detector means for generating a difference signal representative of a phase difference between said reference signal and a signal derived from said second clock signal produced by said oscillator; and
means for applying said difference signal to said frequency control input of said gated oscillator.

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5,036,294

## PHASE LOCKED LOOP HAVING LOW-FREQUENCY JITTER COMPENSATION

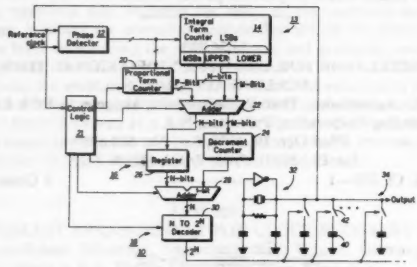
Shawn R. McCaslin, Cedar Creek, Tex., assignor to Motorola Inc., Schaumburg, Ill.

Filed Dec. 3, 1990, Ser. No. 620,686
Int. Cl.[5] H03L 7/093
U.S. Cl. 331—1 A 8 Claims

1. A phase locked loop, comprising:
a phase detector implemented with digital circuitry having a first input for receiving a first clock signal which is a reference signal, a second input for receiving an output signal of the phase locked loop, and an output indicating a

phase relationship between the first and second clock signals;

a digital filter circuit having an input coupled to the output of the phase detector, the digital filter circuit generating a proportional control term and an integral control term, summing the proportional control term and the integral




control term to provide a digital signal representing a filtered output defining how to adjust the output signal of the phase locked loop circuit to maintain a predetermined output frequency; and

a digitally controlled analog oscillator coupled to the digital filter circuit for providing the output signal in response to the digital signal of the filter.

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**5,036,295**

## FREQUENCY SYNTHESIZER ALLOWING RAPID FREQUENCY SWITCHING

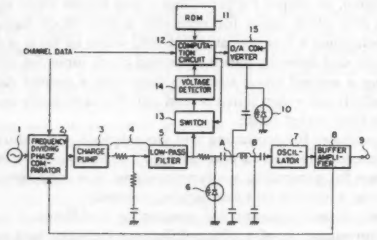
**Toshiki Kamitani, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 30, 1990, Ser. No. 559,040**

**Claims priority, application Japan, Aug. 10, 1989, 1-207347; May 16, 1990, 2-126114**

**Int. Cl.[5] H03L** *7/085, 7/18*

**U.S. Cl. 331—10** **12 Claims**




1. A frequency synthesizer, comprising:

an oscillator which generates an oscillation output signal having a frequency determined by the total capacitance value of a variable capacitance input stage whose capacitance value varies as a function of input d.c. voltage;

phase comparator means for comparing the phase of a signal proportional to said oscillation output signal with the phase of a reference signal, and outputting a phase difference signal corresponding to the phase difference therebetween;

filter means for converting said phase difference signal into a first d.c. voltage and applying the first d.c. voltage to one input temrinal of said variable capacitance input stage;

memory means for storing voltage value data representative of nominal d.c. voltage values to be applied to a second input terminal of said variable capacitance input stage according to the frequency of a channel indicated by channel data inputted to said synthesizer;

voltage detection means for measuring the value of the d.c. voltage of said filter means and generating a measured signal representative thereof;

computation means responsive to said channel data and said measured signal for reading nominal d.c. voltage value data from said memory means and modifying the read value data as a function of said measured signal to produce modified voltage value data; and

conversion means for converting said modified voltage value data into a second d.c. voltage and applying said second d.c. voltage to said second input terminal of said variable capacitance input state.

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**5,036,296**

## FREQUENCY TRACKING CIRCUIT USING SAMPLES EQUALIZED AT DIFFERENT SAMPLING INSTANTS OF SAME CLOCK PERIOD

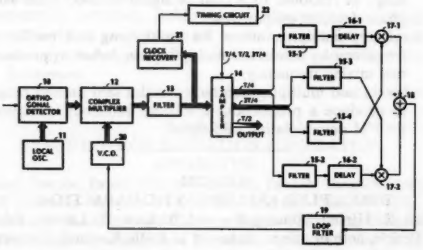
**Shousei Yoshida, Tokyo, Japan, assignor to NEC Corporation, Japan**

**Filed Sep. 13, 1990, Ser. No. 582,147**

**Claims priority, application Japan, Sep. 13, 1989, 1-238614; Apr. 25, 1990, 2-109928**

**Int. Cl.[5] H03C** *3/00*

**U.S. Cl. 331—17** **14 Claims**




1. A frequency discriminator adapted to receive orthogonal symbols, comprising:

first equalizer means for equalizing a real part of said symbols which occurs at a first instant of a period of said symbols so that intersymbol interference of said real part is reduced to a minimum;

second equalizer means for equalizing an imaginary part of said symbols which occurs at said first instant so that intersymbol interference of said imaginary part is reduced to a minimum;

third equalizer means for equalizing a real part of said symbols which occurs at a second instant of said period so that intersymbol interference of said real part is reduced to a minimum;

fourth equalizer means for equalizing an imaginary part of said symbols which occurs at said second instant so that intersymbol interference of said imaginary part is reduced to a minimum;

first delay means for delaying an output signal of said first equalizer means by a time interval equal to the interval between said first and second instants;

second delay means for delaying an output signal of said second equalizer means by a time interval equal to said interval between the first and second instants;

first multiplier means for multiplying an output signal of said first delay means with an output signal of said fourth equalizer means;

second multiplier means for multiplying an output signal of said second delay means with an output signal of said third equalizer means; and

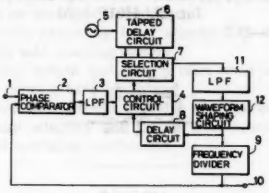
subtracter means for providing subtraction between output signals of said first and second multiplier means.

5,036,297

## HIGH-SPEED DIGITAL PLL DEVICE

Seizo Nakamura, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Sep. 6, 1990, Ser. No. 578,555
Claims priority, application Japan, Sep. 8, 1989, 1-231489
Int. Cl.[5] H03L 7/06, 7/081
U.S. Cl. 331—17 7 Claims




1. A high-speed digital PLL device for producing a signal in synchronism with the phase of an input digital signal, comprising:

a tapped delay timer producing a plurality of signals which have phases different from each other;

a selection circuit for selectively outputting the output signals of the tapped delay circuit;

a frequency divider for frequency-dividing the output signal of the selection circuit;

a phase comparator for comparing the phases of the input digital signal and the output signal of the frequency divider;

a control circuit for controlling the signal selection of the selection circuit in accordance with the output of the phase comparator, so as to make the phase of the output signal of the frequency-divider to coincide with the input digital signal;

a low-pass filter for removing a hazard that is generated in the selection circuit; and

a waveform shaping circuit for shaping the waveform of the output signal of the low-pass filter into rectangular waveform.

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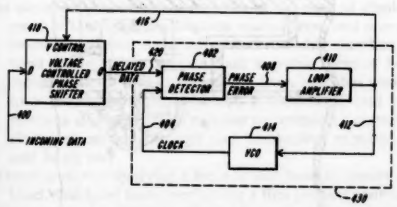
5,036,298

## CLOCK RECOVERY CIRCUIT WITHOUT JITTER PEAKING

John Bulzachelli, Arlington, Mass., assignor to Analog Devices, Inc., Norwood, Mass.

Filed Apr. 26, 1990, Ser. No. 514,748
Int. Cl.[5] H03L 7/00
U.S. Cl. 331—23 17 Claims




1. Phase-locked loop signal recovery apparatus for recovering a periodic signal from an incoming data stream, said signal recovery apparatus comprising:

means responsive to a control signal for generating a variable-frequency periodic signal;

delay means responsive to said control signal for selectively delaying said incoming data stream to generate a delayed data stream; and

means responsive to said delayed data stream and to said variable-frequency periodic signal for generating said control signal, said control signal being indicative of the phase difference between said delayed data stream and said variable frequency periodic signal.

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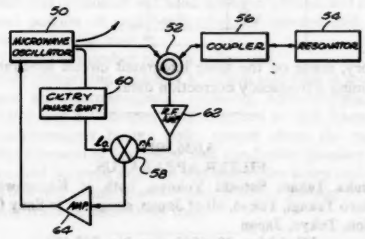
5,036,299

## METHOD AND APPARATUS FOR REDUCING MICROWAVE OSCILLATOR OUTPUT NOISE

G. John Dick, Claremont, and Jonathan E. Saunders, Costa Mesa, both of Calif., assignors to California Institute of Technology, Pasadena, Calif.

Filed Jun. 22, 1990, Ser. No. 541,968
Int. Cl.[5] H03L 7/00
U.S. Cl. 331—25 29 Claims




1. In a method for reducing noise in the output of a tunable microwave oscillator of the type that includes a feedback arrangement for providing a corrective signal, said feedback arrangement including a resonator for receiving the output of said oscillator and an active phase detector for detecting fluctuations in said output by comparing said output with the signal emitted by said resonator, the improvement comprising the step of suppressing the carrier of said signal emitted by said resonator prior to applying said suppressed carrier signal to said phase detector.

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5,036,300

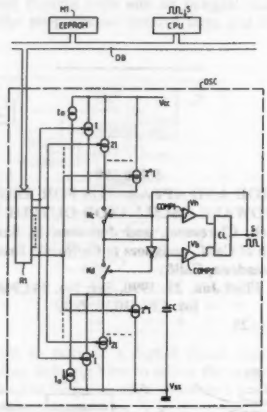
## INTEGRATED CIRCUIT WITH MICROPROCESSOR AND PROGRAMMABLE INTERNAL CLOCK

Jean Nicolai, Aix en Provence, France, assignor to SGS-Thompson Microelectronics S.A., Gentilly, France

Filed Jul. 3, 1990, Ser. No. 547,876
Claims priority, application France, Jul. 7, 1989, 89 09196
Int. Cl.[5] H03K 3/02
U.S. Cl. 331—143 2 Claims

1. An integrated circuit including a processor and an oscillator integrated into the same substrate as the processor, said integrated circuit also including a data register capable of being loaded by the processor, said oscillator acting as a clock for the processor and being a relaxation oscillator including a capacitor and current sources for charging and discharging the capacitor and the register controlling the value of the currents for charging and discharging the capacitor to adjust the fre-

quency of the oscillator, wherein the register is loaded by the processor from an electrically programmable nonvolatile




memory, made on the same integrated circuit substrate and containing a frequency correction data.

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**5,036,301**

## FILTER APPARATUS

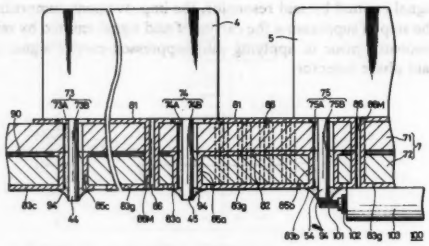
**Nobutaka Takao; Satoshi Yokoya, both of Kanagawa, and Kotaro Takagi, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Mar. 28, 1990, Ser. No. 500,481**

**Claims priority, application Japan, Mar. 30, 1989, 1-79941; Mar. 30, 1989, 1-79942**

**Int. Cl.[5] H03H *7/00*; H05K *1/11***

**U.S. Cl. 333—185** **10 Claims**



1. A filter apparatus comprising:

a multi-layer printed circuit board formed of first and second insulating substrates;

a filter mounted on said printed circuit board, said filter having input and output terminals which extend through and protrude from said printed circuit board;

a connection conductive pattern formed on said second insulating substrate on an inner surface thereof facing said first insulating substrate; and

a plurality of conductive layers formed on outer surfaces of said first and second insulating substrates, said plurality of conductive layers being arranged with a first of said conductive layers positioned above said connection conductive pattern and a second of said conductive layers positioned below said connection conductive pattern, wherein at least one of said input and output terminals of said filter is connected to said connection conductive pattern and said plurality of conductive layers are grounded, thereby shielding said connection conductive pattern.

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**5,036,302**

## RADIO RECEIVER FILTER WITH IMAGE REJECTION

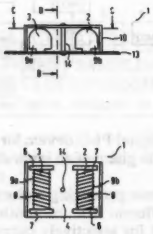
**Jeffrey E. Hales, Keysborough, Australia, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Jun. 15, 1990, Ser. No. 539,094**

**Claims priority, application Australia, Jun. 19, 1989, PJ4812**

**Int. Cl.[5] H01P *1/20***

**U.S. Cl. 333—202** **16 Claims**



1. A radio receiver comprising a filter having one or more filter sections, each filter section comprising: a shield having therein a plurality of helical resonators each having a quarter-wavelength transmission line wound in the form of a helix with the transmission lines of adjacent resonators being wound in opposite directions and being grounded at opposite ends, such that the frequency response of the filter section has a transmission notch on the high frequency side of the filter section passband; and one or more grounded shielding pins disposed between adjacent helical resonators at such locations that the transmission notch in the frequency response of the filter section is steered to be coincident with or near to the image frequency.

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**5,036,303**

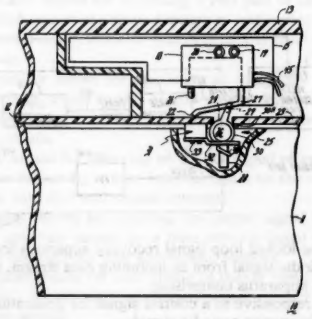
## BELL ALARM ACCESSORY ARRANGEMENT FOR MOLDED CASE CIRCUIT INTERRUPTER

**Thomas F. Papallo, Jr., Plainville, and Roger N. Castonguay, Terryville, both of Conn., assignors to General Electric Company, New York, N.Y.**

**Filed May 3, 1990, Ser. No. 518,674**

**Int. Cl.[5] H01H *9/02***

**U.S. Cl. 335—17** **9 Claims**



1. A molded case circuit interrupter comprising:

a molded plastic case and cover;

an operating mechanism within said case arranged for automatically separating a pair of contacts upon occurrence of an overcurrent condition within a protected circuit;

a bell alarm accessory within said cover said bell alarm accessory including a flat spring arranged over an actuator button;

a bell alarm interface unit intermediate said bell alarm accessory and said operating mechanism for actuating said bell alarm upon occurrence of said contact separation said interface unit comprising a cylinder rotatably attached to a bottom of said cover;

a resetting system in said case intermediate said operating mechanism and said interface unit for resetting said bell alarm to an unactuated condition;

a downwardly-extending level attached to said cylinder proximate said resetting system;

said resetting system including a reset lever arranged for rotating about a fixed pivot; and

a driver level attached to a movable pivot on said operating mechanism whereby said driver level rotates in unison with said operating mechanism.

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**5,036,304**

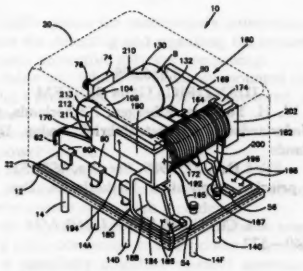
## ROLAMITE SENSOR

**Richard J. Russell, Burbank; Freddie E. Hunt, Rancho Cucamonga, and Frank K. Chung, Diamond Bar, all of Calif., assignors to TRW Technar Inc., Irwindale, Calif.**

**Filed Mar. 28, 1990, Ser. No. 500,691**

**Int. Cl.[5] H01F *1/00*; H01H *1/12, 35/14***

**U.S. Cl. 335—209** **31 Claims**



1. An apparatus comprising:

a movable member;

a base having a guide surface defining a path along which said movable member moves;

a band of flexible electrically conductive material at least partially encircling said movable member and which is partially displaced upon movement of said movable member, said band having first and second end portions, said first end portion being fixedly attached to said base;

an electrically conductive member in the path of displacement of said band at a location spaced from said movable member and said band when said movable member and band are in a first position, said movable member being movable along said guide surface from said first position to a second position in which a portion of said band contacts said conductive member to complete a circuit for electrical current through said conductive member and said band; and

a band tensioner applying a force to said band to tension said band, said band tensioner having a first portion connected to a side of said base under said guide surface, said band tensioner projecting outwardly of said guide surface and having a curved end portion spaced from said base, said second end portion of said band being fixed to said first portion of said band tensioner, said band extending from said first portion of said band tensioner around said curved end portion of said band tensioner toward said guide surface of said base.

28. An apparatus comprising:

a movable member;

a base having a guide surface defining a path along which said movable member moves;

a band of flexible electrically conductive material at least partially encircling said movable member and which is partially displaced upon movement of said movable membe, said band having first and second end portions, said first end portion being fixedly attached to said base;

an electrically conductive member in the path of displacement of said band at a location spaced from said movable member and said and when said movable member and band are in a first position, said movable member being movable along said guide surface from said first position to a second position in which a portion of said band contacts said conductive member to complete a circuit for electrical current through said conductive member and said band;

a band tensioner applying a force to said band to tension said band, said band tensioner having a first portion connected to a side of said base under said guide surface, said band tensioner projecting outwardly of said guide surface and having a curved end portion spaced from said base, said second end portion of said band being fixed to said first portion of said band tensioner, said band extending from said first portion of said band tensioner around said curved end portion of said band tensioner toward said guide surface of said base;

said movable member being a roller; and

further comprising a chassis to which said base is mounted and an electromagentic including anon-ferromagnetic frame and a U-shaped core attached to said frame, said electromagnet having poles spaced about the path of displacement of said roller, said conductive member being located between said coil and said roller when said roller is in it first position, said chassis having a portion on which said frame is selectively fixed.

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**5,036,305**

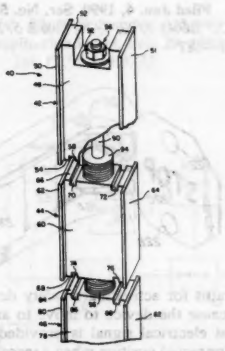
## SEGMENTED INTERLAYER SPACER BARS FOR MULTILAYER SUPERCONDUCTING SOLENIDS

**Jeffery T. Dederer, Allegheny County, and Donald T. Hackworth, Monroeville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Jan. 16, 1990, Ser. No. 465,664**

**Int. Cl.[5] H01F *3/00***

**U.S. Cl. 335—216** **16 Claims**



1. In a multilayer coil structure having at least two adjacent coil layers, the improvement comprising:

a plurality of spacers interposed between the adjacent coil layers and separated from one another to provide open spaces between the layers, each of said spacers comprising:

a first block of insulating material;

a second block of insulating material;
a rod connecting said first and second blocks; nd
a resilient member interposed between said first and second blocks.

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**5,036,306**

**PRESSURE RESPONSIVE POTENTIOMETER**

**Lars A. Bergkvist, Själevad, Sweden, assignor to Labino Patent AB, Sjalevad, Switzerland**

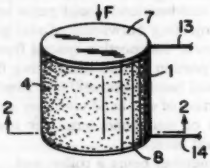
**PCT No. PCT/SE88/00604, § 371 Date Jul. 7, 1989, § 102(e) Date Jul. 7, 1989, PCT Pub. No. WO89/04953, PCT Pub. Date Jun. 1, 1989**

**PCT Filed Nov. 10, 1988, Ser. No. 381,669**

**Claims priority, application Sweden, Nov. 20, 1987, 8704604**

**Int. Cl.[5] H01C *10/10***

**U.S. Cl. 338—114** **10 Claims**




1. A pressure responsive potentiometer including an elastic body which comprises silicone mass mixed with a carbon fraction in such quantities that the electrical resistance across the body is changed in response to a force applied to the body, and which body has electrically conductive contact elements connected thereto in mutually spaced relationship, characterized in that the body is produced from a mixture comprising silicone mass, silicone oil and carbon grains in which the weight ratio of silicone mass to silicone oil is in the range of from about 1:0.3 to 1:0.5, and in which each of the carbon grains has a size which is in the size range which corresponds to the sieve size range which is from a 50 mesh sieve to a 10 mesh sieve.

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**5,036,307**

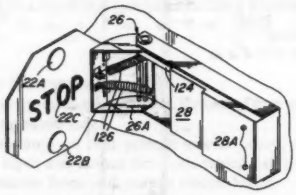
**WEATHER RESISTANT CONTROL SYSTEM FOR SCHOOL BUS SAFETY DEVICE**

**James Reavell, and Raymond Heath, both of Campbellford, Canada, assignors to School Bus Parts Co. of Canada, Inc., Ontario, Canada**

**Filed Jun. 4, 1990, Ser. No. 533,269**

**Int. Cl.[5] B60Q *1/00, 1/26;* G08B *5/24;* E01F *9/10***

**U.S. Cl. 340—487** **17 Claims**




1. Apparatus for activating a safety device mounted on a vehicle to cause the device to move to an extended position when a first electrical signal is provided and to return the device to a retracted position when a second electrical signal is provided, said apparatus comprising:

(a) a motor having rotatable output means selectably energizable by a DC power source and operatively coupled to the safety device through motion translation means for translating the rotary motion of said output means to reciprocating motion for moving said safety device, whereby during one half cycle in the course of a single cycle of rotation of said output means said translation means moves the safety device to said extended position, and during a second half cycle of said single cycle, said translation means returns said safety device to said retracted position;

(b) a rotor having a peripheral surface coupled to said rotatable output means for rotation thereby;

(c) an electrically conductive rotor element mounted on said rotor at a discrete localized point on said peripheral surface and electrically coupled to said power source;

(d) first and second electrically conductive elements located adjacent said peripheral surface of said rotor at diametrically opposed positions, said first and second electrically conductive elements being electrically coupled to said power source and arranged to be selectively electrically engaged by said rotor element;

(e) electrical relay means electrically coupled to said first and second electrically conductive elements and said power source and operative to selectively control the energization of said motor from said power source when said rotor element electrically engages said elements.

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**5,036,308**

**IDENTIFICATION SYSTEM**

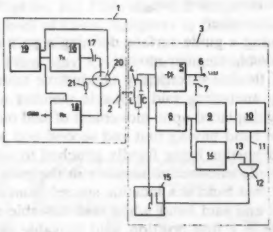
**Tallienco W. H. Fockens, Elbergen, Netherlands, assignor to N.V. Nederlandsche Apparatenfabriek Nedap, De Groenlo, Netherlands**

**Filed Dec. 22, 1989, Ser. No. 455,152**

**Claims priority, application Netherlands, Dec. 27, 1988, 8803170**

**Int. Cl.[5] G08B *13/14;* H04B *1/44***

**U.S. Cl. 340—572** **18 Claims**



1. In an identification system for wireless electronic identification and data transmission, comprising a reading unit and at least one electronic label, each electronic label comprising a resonant circuit and carrying data stored in a memory device of label and capable of being read wirelessly when the label is introduced into a high-frequency interrogation field formed by a transmitter of the reading unit, the improvement wherein:

said reading unit comprises a control device which, in operation, periodically switches the interrogation field on and off and in the time intervals when the field is switched off switches on a receiver capable of detecting a signal transmitted by a label; and

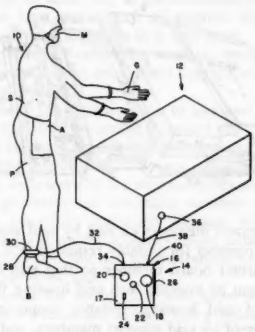
said at least one label each comprises a modulator in which in the time intervals when the field is switched off modulates the quality factor Q of the resonant circuit in dependence on the data stored in the memory device.

**5,036,309**

## PORTABLE SYSTEM AND METHOD FOR CONTINUOUSLY MONITORING PROTECTIVE CLOTHING FOR DETECTING AND SIGNALING THE OCCURRENCE OF A BREACH THEREIN

**Everett G. Dennison, Jr., 200 Glenview Rd., Canfield, Ohio 44406**

**Filed Jun. 14, 1990, Ser. No. 537,811**
**Int. Cl.[5] G08B *21/00***
**U.S. Cl. 340—540** **27 Claims**



1. A portable system for continuously monitoring a protective garment for detecting and signalling the occurrence of a breach in such protective garment comprising:

A) a portable unit which is releasably mounted on a person wearing a protective garment to be monitored, and which includes

(1) a housing,

(2) a power source,

(3) an alarm device,

(4) a circuit for connecting said alarm device to said power source and which includes

(a) an amplifier connected to said power source,

(b) a relay connected to said power source, and

(c) a sensitivity adjusting element connected to said power source;

B) normally open switch means for causing said circuit to actuate said alarm device when closed, said switch means being closed when the person's skin contacts some portion of a workpiece on which that person is working, said switch means including

(1) a first electrical contact element in electrically conducting contact with the person wearing the protective garment being monitored,

(2) a second electrical contact element in electrically conducting contact with the workpiece,

(3) a first electrical wire connecting said first electrical contact element with one side of said circuit, said first electrical wire being fully electrically insulated between said first electrical contact element and said circuit,

(4) a second electrical wire connecting said second electrical contact element with another side of said circuit, said second electrical wire being fully electrically insulated between said second electrical contact element and said circuit,

said protective garment being electrically insulating and being electrically interposed between said first electrical contact element and said electrically conductive workpiece and preventing formation of an electrically conductive path between said workpiece and said first electrical contact element when said protective garment is imperforate and permitting formation of an electrically conductive path between said workpiece and said first electrical contact element via any perforation in said protective garment, the formation of said electrically conductive path closing said normally open switch and applying power from said power source to said alarm device to activate said alarm device, and

said sensitivity-adjusting element being set so that any perforation in said protective garment will cause said electrically conductive path to be formed so that the integrity of said protective garment is monitored at all times during any work procedure.

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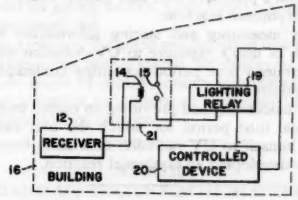
**5,036,310**

## REMOTE MAIL DELIVERY REPORTING SYSTEM TRIGGERED BY PREDETERMINED MAIL IN A MAILBOX

**David E. Russell, 2554 Ernest St., Jacksonville, Fla. 32204**

**Filed Jan. 4, 1991, Ser. No. 637,441**
**Int. Cl.[5] G08B *21/00***
**U.S. Cl. 340—569** **20 Claims**




1. A remote control actuating system comprising a mailbox, a radio transmitter attached to said mailbox, means for detecting the presence of a selectively predetermined piece of mail introduced into said mailbox and for actuating said transmitter, a tuned radio receiver remote from said transmitter, said transmitter broadcasting a radio signal to said tuned radio receiver, means operated by said receiver for controlling the ultimate operation of a relay, motor, motor starter, appliance or mechanical device located remote from said mailbox, said means for detecting including a metal detector and said piece of mail including a metal object.

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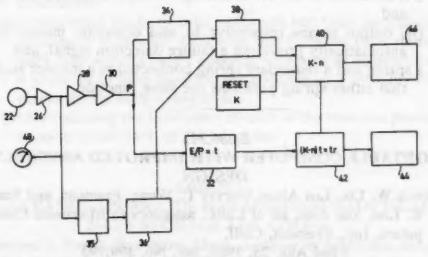
**5,036,311**

## UV EXPOSURE MONITORING SYSTEM

**Dan Moran, 19 Aluf David Street, Ramat Chen, Ramat Gan, and Yonatan Gerlitz, 23 Malchei Yisrael Street, Herzliya, both of Israel**

**Filed Feb. 22, 1989, Ser. No. 313,999**
**Claims priority, application Israel, Feb. 29, 1988, 85575**
**Int. Cl.[5] G01J *5/32***
**U.S. Cl. 340—600** **15 Claims**




8. A system for alerting humans to impending overexposure to UV radiation comprising:

a UV exposure monitoring system comprising apparatus for measuring incident solar UV radiation in a weighted manner corresponding to the erythemal action spectrum of human skin, whereby the accuracy of the measurements is

substantially unaffected by the angle of incidence of incoming radiation over a wide range of angles, said apparatus for measuring comprising:

a filter formed as coating onto a curved substrate; and

a detector whose wavelength responses are selected such that the overall wavelength dependent response corresponds to the erythemal action spectrum of human skin,

and wherein said filter possesses spectral transmittance characteristics which, in combination with spectral response characteristics of said detector, simulate the erythemal action spectrum of human skin;

overexposure detection means associated with said UV exposure monitoring system; and

overexposure warning means for altering a user to impending overexposure to UV radiation

and wherein said overexposure detection means comprises:

means for receiving said measurements from said detector;

means for calculating a maximal time period for which user can expose himself to UV radiation emanating from the sun within a predetermined time period without developing an erythemal reaction;

means for measuring and storing information regarding duration of user's exposure to UV-radiation within said predetermined time period preceding contemplated further exposure; and

means for calculating and providing an output indication of a residual time period for which the user can further expose himself to UV radiation emanating from the sun without developing an erythemal reaction.

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**5,036,312**

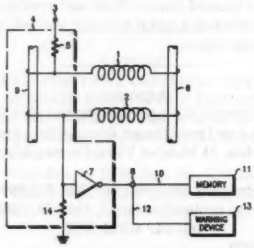
**SPRING FAILURE DETECTION AND SAFETY SYSTEM**

**Theodore V. Lester, Schiller Park, Ill., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Jan. 3, 1989, Ser. No. 293,036**

**Int. Cl.[5] G08B *21/00*; F16F *1/00***

**U.S. Cl. 340—679** **12 Claims**




1. A spring failure detection device comprising:

(A) detection means for detecting a failure in anyone spring; and

(B) output means responsive to said detection means for automatically providing a failure detection signal, and

a spring and a redundant spring connected in a manner such that either spring performs the same function.

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**5,036,313**

**PORTABLE COMPUTER WITH IMPROVED ASSEMBLY DESIGN**

**Frank W. Lin, Los Altos; Harvey C. Wong, Fremont, and Sam K. Lim, San Jose, all of Calif., assignors to Micronics Computers, Inc., Fremont, Calif.**

**Filed Aug. 25, 1989, Ser. No. 398,793**

**Int. Cl.[5] G09G *5/00***

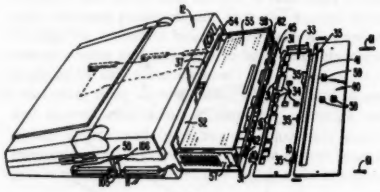
**U.S. Cl. 340—700** **10 Claims**

1. A portable computer having a plurality of electromechanical modules, said computer comprising:

a housing having a base member and a cover member, said base member including a support surface, a pair of laterally spaced side portions, a front portion and a rear portion;

at least one socket secured to said support surface adjacent said front portion for enabling electrical coupling to at least one of said electromechanical modules;

a circuit board member including a support surface having electrical components supported thereby and front, rear and laterally spaced edge portions, said front portion including an outwardly extending plug margin dimensioned to be received in said socket;



a pair of support members carried by said side portions of said base member for slidably retaining said edge portion of said circuit board member so that said circuit board member can be inserted into said housing from the rear portion of said housing, slidably supported along the edges thereof by said support members, and wherein the plug margin of said circuit board member can be mated with said socket member to enable said electrical components supported on said circuit board to be coupled to the electromechanical modules.

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**5,036,314**

**METHOD AND SYSTEM FOR THE INTEGRATED SUPPLY OF TELEMATIC SERVICES AND GRAPHIC INFORMATION TO USER TERMINALS, PARTICULARLY FOR ADVERTISING PURPOSES**

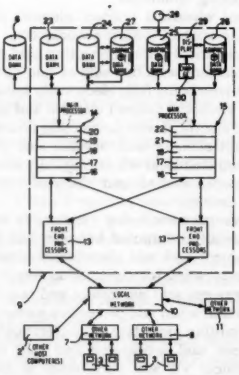
**Piero Barillari; Pierluigi DeSanti; Mario Galderesi; Carlo A. Marchi; Franco Natili, all of Rome; Vincenzo Rossiello, Pomezia; Donato Settembre, Rome, and Francesco Urbinati, Rome, all of Italy, assignors to Sarin S.S. Ausiliari e Ricerca Informatica, Pomezia, Italy**

**Filed Jan. 12, 1989, Ser. No. 296,160**

**Claims priority, application Italy, Jan. 12, 1988, 67013 A/88**

**Int. Cl.[5] G09G *5/00***

**U.S. Cl. 340—717** **10 Claims**



1. A method for the integrated supply of telematic services

and graphic information to user terminals, including the steps of:

providing at least one source of telematic services which generates information messages,

providing a network for linking the user terminals to the source of telematic services, wherein said network enables the transmission of information messages from the source of telematic services to the user terminals;

providing each user terminal with a graphics function for generating non-elementary image components on a screen wherein said non-elementary image components are determined by command messages transmitted through the network int he same way as the information messages,

providing at least one source of graphic information by storing command messages in a data bank,

including within each command message, image component information including component configuration type, size, location, and color,

supplying the graphic information to said user terminals by transmitting sets of command messages and concomitantly therewith transmitting information messages related to the graphic information,

providing at least some of the user terminals with a function for user generation of command message sets, wherein said user generated command message sets produce a graphic message on the screens of user terminals and are completed by said function before transfer to the source of telematic services, and

providing means for storing said user generated command message sets within said at least one graphic information source.

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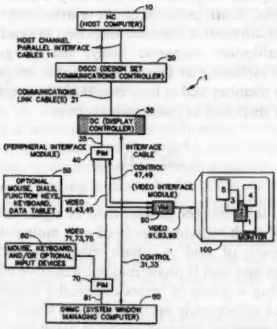
**5,036,315**

## SIMULTANEOUS DISPLAY OF INTERLEAVED WINDOWED VIDEO INFORMATION FROM MULTIPLE ASYNCHRONOUS COMPUTERS ON A SINGLE VIDEO MONITOR

**James Gurley, San Diego, Calif., assignor to Spectragraphics, Inc., San Diego, Calif.**

**Filed Sep. 6, 1988, Ser. No. 241,031**
**Int. Cl.[5] G09G *5/14***
**U.S. Cl. 340—721** **7 Claims**




1. A system for simultaneously displaying information in a multiplicity of display windows upon a single monitor resultant from the simultaneous asynchronous display signals arising at a plurality of computers, the system comprising:

a first computer running a windowed display program for producing a first video frequency analog signal bearing information suitable for display, and a signal indicating the location and size of a window reserved for display use by the second computer;

a second computer for producing a signal bearing information suitable for display;

a communication and display controller receiving (i) the second computer's display signal, (ii) so much of the first computer's first video frequency analog signal as permits recognition of its video synchronization, and (iii) the first computer's signal indicating the location of the reserved window,

for outputting the second computer's display signal as a second video frequency analog signal synchronized to the first video frequency analog signal,

for scaling and locating the informational content of the second video frequency analog signal to be within the reserved window of a display, and

for producing a switch control signal indicating periods when each raster of the synchronized first and second video frequency analog signals is inside the reserved window;

a video switch, receiving the synchronized first and second video frequency analog signals and the switch control signal, for gating the second video frequency analog signal when the video raster is inside the reserved window area and for gating the first video frequency analog signal at other times; and

a display, receiving the gated synchronized first and second video frequency analog signals, for displaying a reserved window inside of which appears information from the second computer and outside of which appears information from the first computer.

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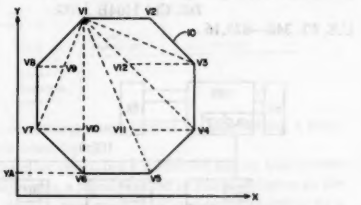
**5,036,316**

## METHOD AND APPARATUS FOR HIGH SPEED LINEAR SHADING IN A RASTER GRAPHICS SYSTEM

**Steven C. Kemplin, Rio Rancho, N. Mex., assignor to Honeywell Inc., Minneapolis, Minn.**

**Filed Apr. 3, 1989, Ser. No. 332,602**
**Int. Cl.[5] G09G *5/36***
**U.S. Cl. 340—728** **12 Claims**




1. A method for linear shading of a polygon rendered in a raster graphics display comprising the steps of:

(a) selecting a key vertex which is located opposite to an edge of the polygon having a selected orientation;

(b) dividing the polygon into a group of triangles so as to create a base leg for each of the triangles in the selected orientation;

(c) calculating the horizontal endpoints and their associated luminance values for each scan line between each triangle's base and the base's opposite vertex so as to describe a plurality of scan lines further comprising a plurality of pixels within each triangle; and

(d) interpolating the luminance of each of the scan line pixels so as to shade each of the triangles.

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**5,036,317**

## FLAT PANEL APPARATUS FOR ADDRESSING OPTICAL DATA STORAGE LOCATIONS

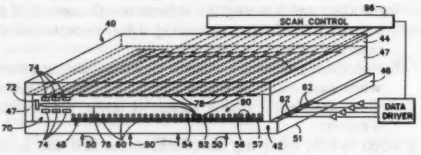
**Thomas S. Buzak, Beaverton, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.**

**Filed Aug. 22, 1988, Ser. No. 234,774**
**Int. Cl.[5] G09G *3/34*; Q11C *11/42***
**U.S. Cl. 340—783** **24 Claims**

14. A method of simultaneously addressing multiple storage locations for optical data, the storage locations including a

dielectric substrate in communication with a first major surface of a layer of material having electro-optic properties, comprising:

defining multiple first stripe regions on a second major surface of the layer and multiple second stripe regions on the dielectric substrate, the storage locations being defined by overlapping portions of the first and second stripe regions;




inducing on the first stripe regions of the second major surface of the layer signals corresponding to the optical data; and

simultaneously effecting emission of electrons from the second stripe regions of the dielectric substrate to develop an electrostatic reference potential on the second stripe regions, thereby to change a property of the layer of electro-optic material in accordance with the optical data and effect storage of the signals by the storage locations.

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**5,036,318**

**MODULAR ISDN COMMUNICATION SYSTEM WITH FORMATION AND DISPLAY OF ERROR TEXTS**

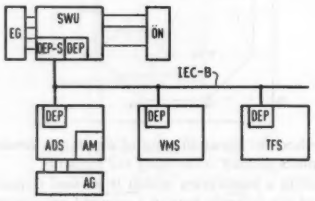
**Gerhard Bachhuber, Wessling, and Detlef Buhse, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 63,068, Jun. 17, 1987, abandoned. This application Jan. 27, 1989, Ser. No. 303,804**

**Claims priority, application Fed. Rep. of Germany, Jul. 23, 1986, 3624906; Sep. 30, 1986, 3633193**

**Int. Cl.[5] H04B *3/00***

**U.S. Cl. 340—825.16** **12 Claims**




1. A modulation communications system with a system-oriented periphery and comprising: a switching unit including a digital switching matrix and a central control device; an administration data server for controlling the system-oriented periphery and storing system files; a plurality of program control modules each constructed in a job-oriented manner; a system bus connecting said switching unit, said administration data server and said program control modules; a plurality of program control module-associated system dependability sub-modules in the respective program control modules, in said administration data server, and in said switching unit; a system dependability systems sub-module in said switching unit hierarchy higher ranking over said system dependability sub-modules; at least one output device including display equipment operable to display errors; error information formed from error signals of the program control modules of the switching unit and said administration data server in respectively assigned system dependability sub-modules being transmitted to said system dependability systems sub-modules of said switching unit, said system dependability systems sub-module of said switching unit responsive thereto to form error reports based on defined ordering criteria including error categories; and said administration data server including a signaling sub-module, a signaling distribution file associated with said signaling sub-module and having data for the report identification, for error categories and for the configuration of the output device, and said error reports being transmitted to said signaling sub-module in a system dependability sub-module data format including a signal format file associated with said signaling sub-module and having data for the conversion of the system dependability sub-module data format into an administration data server system data format of signaling reports used for the formation of error texts in the output device assigned to said signaling sub-module.

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**5,036,319**

**MAGNETIC ENCODER USING MAGNETORESISTIVE ELEMENT**

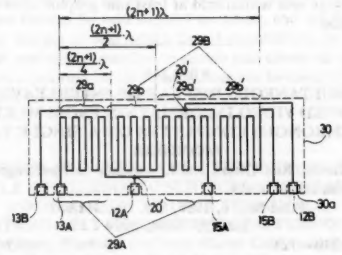
**Manabu Shiraki, Yamato; Osami Miyao, Sagamihara; Shoji Fujisawa, and Shunji Kawashima, both of Yamato, all of Japan, assignors to Shicoh Engineering Co., Ltd., Kanagawa, Japan**

**Continuation of Ser. No. 367,136, Jun. 16, 1989, abandoned. This application Dec. 26, 1990, Ser. No. 632,627**

**Claims priority, application Japan, Jun. 20, 1988, 150361/1988**

**Int. Cl.[5] H03M *1/30***

**U.S. Cl. 341—115** **2 Claims**




1. A magnetic encoder comprising:

(a) a multipolar magnetic body having a row of alternate North and South poles of equal widths; and

(b) a magnetoresistive element disposed in confrontation to said multipolar magnetic body, said magnetoresistive element including at least one A phase magnetoresistive element member and at least one B phase magnetoresistive element disposed in juxtaposition over

$$\frac{(2n+1)}{2} \cdot \lambda$$

where n is an integer greater than or equal to 0, and λ is a width of each individual pole of said multipolar magnetic body, each of said A phase magnetoresistive element members and said B phase magnetoresistive element member having a group of series connected linear conductors arranged side-by-side into a comb-like shape, said A phase magnetoresistive element member extending over

$$\frac{(2n+1)}{4} \cdot \lambda,$$

said B phase magnetoresistive element member being out of phase with said A phase magnetoresistive element member by

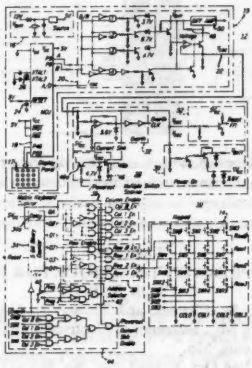
$$\frac{(2n+1)}{4} \cdot \lambda.$$

## 5,036,320

## SMART MULTIPLE SWITCH SCANNER, SINGLE WIRE BUS MULTIPLEX SYSTEM THEREFOR

Thomas R. Wroblewski, Sterling Heights, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Jul. 31, 1989, Ser. No. 386,749
Int. Cl.[5] H03K *17/94*
U.S. Cl. 341—26 10 Claims



1. A single wire bus multiplex system for a smart multiple switch scanner for use with a pulse-train signal comprising a succession of coded-pulse signals superimposed over an offset-voltage signal, said coded-pulse signals providing a series of address codes for addressing a plurality of switches arranged as a matrix of switches at a remote location, said matrix comprising a plurality of row and column lines with each one of said plurality of switches having a post connected to a row line and another post connected to a column, said system comprising:

(a) means for generating the pulse-train signal;

(b) a bi-directional, single-wire bus adapted to transfer the pulse-train signal from a first end of said bus in a first direction to the remote location of the matrix and a series of current signals from a second end in a second direction, said bus being routed near the matrix;

(c) switch scanning means connected between said bus and the matrix, responsive to said pulse-train signal comprising:

(1) means for developing an internal power source from said offset-voltage signal;

(2) means for decoding said coded-pulse signals to obtain a series of address codes for addressing each one of said plurality of switches of the matrix, said decoding means including an asynchronous counting means, said counting means having a capacity to count up to an exact count of twice the total number of switches in the matrix;

(3) means for using said series of address codes to sequentially scan the column and row lines of the matrix so as to sequentially address each one of said plurality of switches; and

(4) means for generating a first current signal on said bus in the second direction indicative that each one of said plurality of switches has been addressed and a second current signal indicative of each one of said plurality of switches being pressed;

(d) analog means at the first end of said bus for receiving said first and second current signals on said bus and producing therefrom a series of analog voltage signal messages;

(e) means for converting said analog voltage signal messages into a first series of digital-coded messages;

(f) means responsive to the digital-coded messages for analyzing the digital-coded messages and providing a second series of digital-coded messages that provide an interpretation of the analyses; and

(g) display means responsive to said second series of digital-coded messages for transforming said second series of digital-coded messages into a visible intelligible message.

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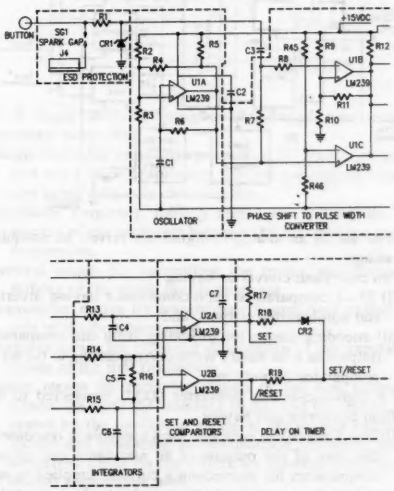
## 5,036,321

## CAPACITIVE SENSING, SOLID STATE TOUCH BUTTON SYSTEM

Robert B. Leach, New Britain; Chester J. Slabinski, New Hartford, and Jean Youla, Hartford, all of Conn., assignors to Otis Elevator Company, Farmington, Conn.

Filed Aug. 31, 1989, Ser. No. 401,363
Int. Cl.[5] H03K *17/955*
U.S. Cl. 341—33 7 Claims




1. A capacitive sensing touch button for controlling a function, said button comprising:

a button surface for receiving a reference signal, said button surface outputting a signal shifted in phase, relative to the reference signal, upon contact of said button surface by a user;

an oscillator, operatively connected to said button surface, to provide the reference signal to said button surface, said oscillator having a predetermined duty cycle;

phase shift to pulse width converter, operatively connected to said button surface and said oscillator, to convert the phase-shifted signal into a pulse width based on the amount of the phase shift relative to the reference signal;

auto-balancing compensation, operatively connected to said phase shift to pulse width converter, including at least two integrators, each having a different time constant, each of said integrators receiving the pulse widths and converting the pulse width into a dc voltage, said auto-balancing compensation outputting either a SET signal or a RESET signal based on the relative dc voltage values produced by said integrators, thereby avoiding false activation of the controlled function due to residual impedence and/or external influences at said button surface; and

delay-on circuitry, operatively connected to said auto-balancing compensation, to receive the signal output therefrom, said delay-on circuitry generating a control signal to control the controlled function provided that said SET signal is present at least a predetermined time

period, thereby avoiding false activation of the controlled function due to transient noise.

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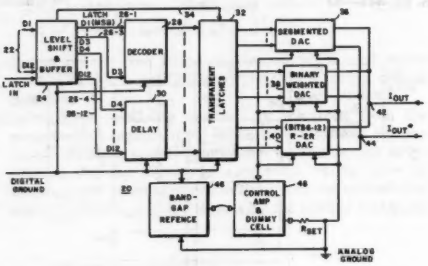
**5,036,322**

## DIGITAL-TO-ANALOG CONVERTERS WITH IMPROVED LINEARITY

**Jeffrey Barrow, Oak Ridge; William J. Pratt, and Henry T. Tsuei, both of Greensboro, all of N.C., assignors to Analog Devices, Inc., Norwood, Mass.**

**Filed Jun. 2, 1989, Ser. No. 360,410**
**Int. Cl.[5] H03M *1/66***
**U.S. Cl. 341—144** **6 Claims**




1. For use in an analog-to-digital converter, an assembly comprising:

(a) an n-bit flash converter having

(i) $2^n-1$ comparators, each comparator having inverted and non-inverted outputs, and

(ii) encoding means for providing from the comparator outputs an n-bit binary word corresponding to the set of comparator outputs; and

(b) a digital-to-analog converter (DAC connected to the flash converter and having

(i) $2^n-1$ electronic switches, each operable in response to the state of the outputs of an associated one of said comparators for connecting a current, supplied to said switch, to a current summing node at which an analog output current is to be provided, and

(ii) means for generating said currents the means for generating said currents comprising, for at lest one of said switches, a plurality of current sources whose outputs are summed together, the number of current sources in said plurality being sufficient to provide a desired current to within a predefined tolerance, and with a predetermined level of confidence.

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**5,036,323**

## ACTIVE RADAR STEALTH DEVICE

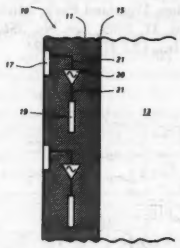
**R. Neal Cain, Fredericksburg, and Albert J. Corda, Dahlgren, both of Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Sep. 17, 1990, Ser. No. 583,624**
**Int. Cl.[5] G01S *7/38;* H01Q *15/00***
**U.S. Cl. 342—6** **11 Claims**

1. An active radar stealth device mounted on a host platform for minimizing the radar cross-section of the host platform, comprising:

a. a coating on a surface of the host platform wherein said coating is essentially transparent with respect to a microwave field incident on said coating, said incident microwave field passing through said coating and reflecting off the host platform to form a reflected microwave field;

b. means contained within said coating for detecting a combination of: (1) said incident microwave field, (2) said reflected microwave field and (3) a canceling microwave field; and



c. means contained within said coating for producing said canceling microwave field in response to said detected combination.

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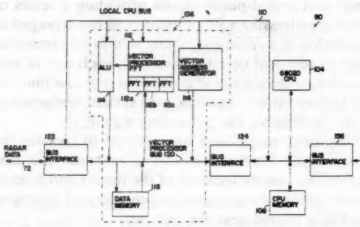
**5,036,324**

## PULSE COMPRESSION TECHNIQUE FOR HIGH DUTY FACTOR RADAR

**David Lamper, St. Charles, and Thomas L. Grettenberg, St. Louis, both of Mo., assignors to Electronics and Space Corporation, St. Louis, Mo.**

**Filed Oct. 5, 1990, Ser. No. 593,027**
**Int. Cl.[5] G01S *13/28, 7/295;* G06F *15/332***
**U.S. Cl. 342—132** **16 Claims**




13. A signal processing method for processing data contained within a signal but in which part of the signal is missing because it falls outside a data sampling window comprising:

converting the resultant data vector in which the data is contained from the time domain into the frequency domain; and,

adding a first block of information at the front end of the data, and a second block of information at the rear end thereof, the addition of said blocks shifting the data sufficiently so it falls within the processing window;

processing the resultant data signal to obtain the desired information which now falls within the data processing window.

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**5,036,325**

## DOPPLER DETERMINATION SYSTEM FOR MTI RADARS

**Edwin L. O'Brien, Fullerton, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

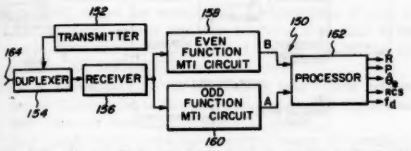
**Filed Oct. 5, 1989, Ser. No. 417,358**
**Int. Cl.[5] G01S *13/526***
**U.S. Cl. 342—160** **19 Claims**

1. A system for estimating the doppler frequency of the target return produced by a moving target indicator (MTI) radar operating at a pulse repetition frequency (PRF, comprising:

a first MTI circuit responsive to the target return for provid-

ing a first MTI return signal A characterized by a frequency response having odd symmetry about the center of the PRF interval;

a second MTI circuit responsive to the target return for providing a second MTI return signal B characterized by a frequency response having even symmetry about the center of the PRF interval;




means responsive to the first and second signals for generating a ratio signal indicative of the ratio of the relative magnitudes of the first and second signals; and

means responsive to said ratio signal for estimating the doppler frequency of the target return.

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**5,036,326**

## METHOD AND DEVICE FOR THE DISPLAY OF SEVERAL RADAR IMAGES IN A SINGLE MOSAIC

**Jean-Pierre Andrieu, Paris; Dominique Gault, Ville D'Avray, and Jean-Claude Henri, Boulogne Billancourt, all of France, assignors to Thomson-CSF, Puteaux, France**

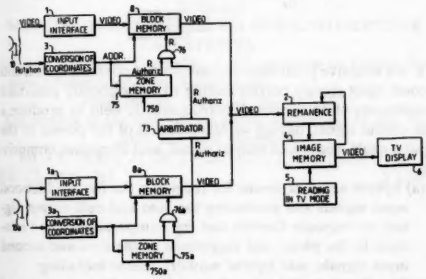
**PCT No. PCT/FR88/00225, § 371 Date Nov. 6, 1989, § 102(e) Date Nov. 6, 1989, PCT Pub. No. WO88/08988, PCT Pub. Date Nov. 17, 1988**

**PCT Filed May 6, 1988, Ser. No. 442,358**

**Claims priority, application France, May 7, 1987, 87 06486**

**Int. Cl.[5] G01S *7/56***

**U.S. Cl. 342—176** **9 Claims**




1. Method for the display of several radar images as a single resultant image, as a mosaic image of said radar images, each of the radar images being provided by a different radar in the form of analog video signals and polar coordinates of a respective radar, comprising:

digitizing the video signal images of the radars:

converting the polar coordinates associated with the video signals into Cartesian coordinates;

memorizing the digitized video signal images and Cartesian coordinates; and,

mutually excluding parts of said radar images comprising for each of the memorized images, transmitting a validated image, the pixels of which are validated by logic means for validating each pixel of each of the memorized images in response to validation data provided by a memory containing a mosaic map, said data identifying said pixel as belonging to the mosaic image to be displayed, and displaying the validated image pixels in a television mode display.

**5,036,327**

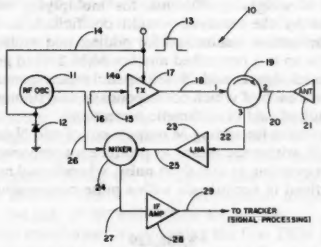
## SINGLE OSCILLATOR FSK PULSED RADAR RECEIVING TRANSMITTER

**Paul H. Dannenberg, Blaine, Minn., assignor to Honeywell Inc., Minneapolis, Minn.**

**Filed Jul. 19, 1990, Ser. No. 554,548**

**Int. Cl.[5] G01S *13/26***

**U.S. Cl. 342—201** **10 Claims**




1. A single oscillator frequency shift keyed radar receiver transmitter comprising

single oscillator means for generating RF signals at least a first and a second frequency, the first and second frequencies being relatively close together;

oscillator frequency shifting means for shifting the frequency of the oscillator between the first and the second frequencies;

control means for controlling the timing and frequency shifting of the single oscillator means;

transmitter means for transmitting intermittent pulsed signals of the first frequency;

receiver means for receiving echo signals of the transmitted pulses of the first frequency;

mixer means for receiving signals of the first frequency conducted from the receiving means and the signals generated by the oscillation means at the second frequency locally and producing an intermediate frequency output therefrom based on the difference between the first and second frequencies; and

signal processing means for processing the intermediate frequency.

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**5,036,328**

## PULSE COMPRESSING APPARATUS FOR A RADAR SYSTEM USING A LONG PULSE

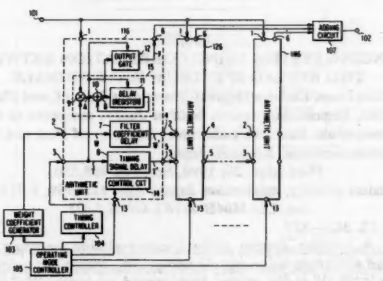
**Hiroshi Nakamura, and Eiichi Kiuchi, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan**

**Filed May 31, 1990, Ser. No. 531,364**

**Claims priority, application Japan, May 31, 1989, 1-138053**

**Int. Cl.[5] G01S *13/28***

**U.S. Cl. 342—204** **9 Claims**




1. A pulse compressing apparatus for use in a radar system

transmitting a long pulse containing a modulated signal within, for converting a received signal into a short pulse, comprising:

weight coefficient generating means for generating a weight coefficient;

delaying means for successively delaying said weight coefficient to generate N weight coefficients differing in delay time;

N arithmetic means each for commonly receiving an input signal having a form of time series data sampled using a prescribed sampling period, for respectively receiving said N weight coefficients, for multiplying said input signal by the received weight coefficients to produce multiplication results and for adding said multiplication results up to a prescribed number M($M \leqq N$) to generate a summed signal, said N arithmetic means generating N outputs each of which corresponds to said summed signal of each of said N arithmetic means; and

adding means for adding M outputs out of said N outputs of said N arithmetic means to produce a compressed signal corresponding to said short pulse, wherein said number M is defined in accordance with a pulse compression ratio.

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**5,036,329**

## GPS SATELLITE SIGNAL TRACKING METHOD FOR GPS RECEIVERS

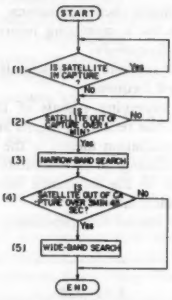
**Hitoshi Ando, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan**

**Filed Aug. 28, 1990, Ser. No. 573,761**

**Claims priority, application Japan, Nov. 22, 1989, 1-301914**

**Int. Cl.[5] G01S *5/02***

**U.S. Cl. 342—357** **9 Claims**




1. A satellite signal tracking method for a GPS receiver comprising the steps of:

performing a narrow-band search for satellite signals when the satellite signal from a GPS satellite being tracked is interrupted for more than a specified period of time; and

switching over the narrow-band search to a wide-band search for searching the satellite signals when the narrow-band search fails to recapture any of the satellite signals within a predetermined duration of time.

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**5,036,330**

## RANGING SYSTEM USING CORRELATION BETWEEN TWO SPREAD SPECTRUM WAVE SIGNALS

**Michito Imae, Kodaira Higashi-Murayama, both of, and Chihiro Miki, Higashi-Murayama, both of Japan, assignors to Communications Research Laboratory Ministry of Post and Telecommunications, Koganei, Japan**

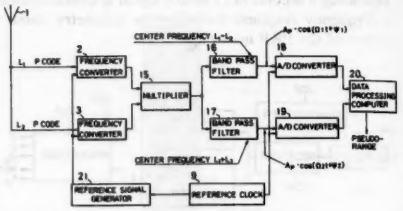
**Filed Mar. 26, 1990, Ser. No. 498,550**

**Claims priority, application Japan, Apr. 11, 1989, 1-91135**

**Int. Cl.[5] H04B *7/185*; G01S *5/02***

**U.S. Cl. 342—357** **1 Claim**

1. A ranging system using the correlation between two spread spectrum wave signals comprising means for receiving from a single radio source two spread spectrum modulated signals simultaneously transmitted in the same code on carrier waves of different frequency, means for multiplying the received signals by each other to generate two continuous signals of frequencies respectively equal to the difference and the sum of the carrier waves of the spread spectrum signals, and means for measuring the phases of the two continuous signals with reference to a reference clock at the receiving station, whereby the ambiguity at the time of range measurement is removed.

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**5,036,331**

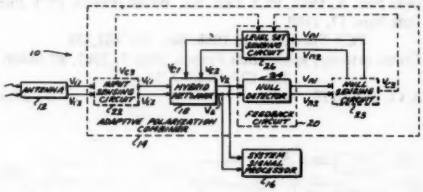
## ADAPTIVE POLARIZATION COMBINER

**Kyle A. Dallabetta, Seattle; Bernard J. Lamberty, Kent, and Kenneth G. Voyce, Bellevue, all of Wash., assignors to The Boeing Company, Seattle, Wash.**

**Filed Sep. 18, 1989, Ser. No. 408,777**

**Int. Cl.[5] H01Q *21/06*; H04B *1/52***

**U.S. Cl. 342—361** **10 Claims**




1. An adaptive polarization combiner for combining first and second input signals corresponding to orthogonally polarized components of an incident electromagnetic field to produce a sum output signal, having substantially all of the power of the input signals, and a null output signal, said combiner comprising:

(a) hybrid network means for receiving the first and second input signals and producing the sum and null output signals in response thereto and for compensating for variations in the phase and magnitude of the first and second input signals, said hybrid network means including:

(i) a first hybrid having first and second input ports and first and second output ports:

(ii) a second hybrid having first and second input ports and sum and null output ports:

(iii) a first phase shifter having an input port, an output port, and a control port:

(iv) a second phase shifter having an input port, an output port, and a control port:

(v) a third phase shifter having an input port, an output port, and a control port; and

(vi) a fourth phase shifter having an input port, an output port, and a control port, the first input signal being received by said input port of said first phase shifter, said output port of said first phase shifter being connected to said first input port of said first hybrid, the second input signal being received by said input port of said third phase shifter, said output port of said third phase shifter being connected to said second input port of said first hybrid, said first output port of said first hybrid being connected to said input port of said second

phase shifter and said output port of said second phase shifter being connected to said first input port of said second hybrid, said second output port of said first hybrid being connected to said input port of said fourth phase shifter and said output port of said fourth phase shifter being connected to said second input port of said second hybrid, the sum output signal being produced at said sum output port of said second hybrid and the null output signal being produced at said null output port of said second hybrid:

(b) sensing means for monitoring the operation of said hybrid network means and for ensuring that said hybrid network means operates properly when one of the first and second input signals is absent; and

(c) null detector means for controlling said hybrid network means in response to the sum and null output signals, said null detector means including:

first synchronous amplitude detector means for producing a first control signal indicative of the amplitude of the in-phase portion of the null output signal relative to the sum output signal, said first synchronous amplitude detector means having a first input port coupled to said sum output port of said second hybrid, a second input port coupled to said null output port of said second hybrid, and an output port coupled to said control port of said second phase shifter;

ninety-degree phase shift means having an input port connected to said sum output port of said second hybrid and a first output port; and

second synchronous amplitude detector means for producing a second control signal indicative of the amplitude of the quadrature portion of the null output signal relative to the sum output signal, said second synchronous amplitude detector means having a first input port connected to said output port of said ninety-degree phase shift means, a second input port coupled to said null output port of said second hybrid, and an output port coupled to said control port of said first phase shifter.

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**5,036,332**

## MULTI-MODE FEED SYSTEM FOR A MONOPULSE ANTENNA

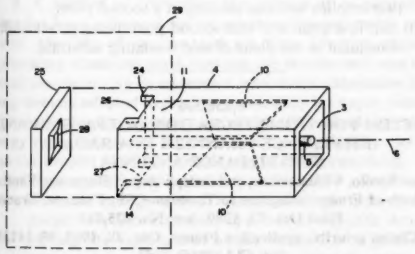
**Delmer L. Thomas, Camarillo, Calif., assignor to Datron Systems Incorporated, Simi Valley, Calif.**

**Filed Jul. 31, 1989, Ser. No. 387,137**

**The portion of the term of this patent subsequent to Jul. 18, 2006, has been disclaimed.**

**Int. Cl.[5] H01Q *21/06, 19/00;* G01S *13/00;* H01P *1/16***

**U.S. Cl. 342—361** **1 Claim**




1. A multi-mode feed system for a monopulse antenna for two-dimensional tracking of and/or communicating data to or from an object in the electromagnetic far-field of the antenna comprising:

a hybrid combiner having first and second input ports and a sum and a difference output port;

a feed horn;

a multi-mode wave-guide having a central coaxial conductor and having front and rear openings, the multi-mode wave-guide supporting a first electromagnetic wave propagation mode of the TEM type and a second and a third electromagnetic wave propagation mode of the TE $_{11}$ type near the front opening and a fourth electromagnetic wave propagation mode of the TE $_{11}$ type near the rear opening;

the multi-mode wave-guide having a polarizer located therein;

a mode transformer having a multi-mode port and first and second mono-mode ports, the multi-mode port being connected to the rear opening of the multi-mode wave-guide and the first and second mono-mode ports being connected respectively to the first and second input ports of the hybrid combiner,

the front opening of the multi-mode wave-guide being connected to the feed horn,

the polarizer transforming the second and third TE $_{11}$ propagation modes located near the front of the multi-mode waveguide, where said second and third TE $_{11}$ propagation modes are orthogonal and in phase quadrature, into the fourth TE $_{11}$ propagation mode located near the rear of the multi-mode waveguide,

the mode transformer transforming the first TEM propagation mode at its multi-mode port into a first and a second transformed TEM mode at its first and second mono-mode ports respectively and transforming the fourth TE $_{11}$ propagation mode at the multi-mode port into a first and a second transformed TE $_{11}$ mode at its first and second mono-mode ports respectively,

means for connecting the first input port of the hybrid combiner to the first mono-mode port of the mode transformer,

means for connecting the second input port of the hybrid combiner to the second mono-mode port of the mode transformer,

the sum output (shunt) port of the hybrid combiner providing a sum output responsive to the first TEM propagation mode and the series output port of the hybrid combiner providing an output responsive to the fourth TE $_{11}$ propagation mode, the output from the sum output port being compared with the output from the series output port to provide tracking data, and the output from the series output port also providing means for communicating data.

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**5,036,333**

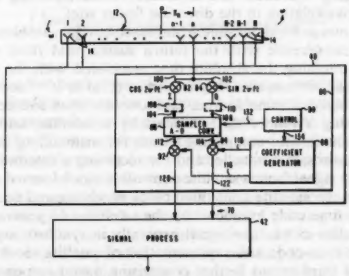
## ANTENNA-ROTATION COMPENSATION APPARATUS AND METHOD FOR PHASED ARRAY ANTENNAS

**C. Weldon Chapman, Garden Grove, and Thomas W. Miller, Yorba Linda, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Jun. 21, 1990, Ser. No. 541,683**

**Int. Cl.[5] G01S *1/78***

**U.S. Cl. 342—370** **25 Claims**




1. Electronic apparatus for compensating for the rotation of a rotatably-mounted, phased array radar antenna which has a number, N, of radiating and receiving elements arranged

across the antenna in a direction transverse to the axis of antenna rotation and which is configured so that each of the elements provides separate radar return signal components from radar signal reflections received thereby, the rotation compensating apparatus comprising:

means for sampling the return signal components provided by each of the elements in blocks of K sequential samples, each of said blocks having a pre-established time length, and for digitizing each of said samples;

means for providing a predetermined, specific phase angle correction factor, $\Delta_n(i)$, for each ith one of each of the K samples of the signal components from each nth one of said N elements, wherein i=1,2,3, . . . ,K and n=1,2,3 . . . ,N, each said correction factor being dependent on the distance of the corresponding element from the axis of antenna rotation; and

means for multiplying the return signal components provided by each of the N elements for each K samples by the corresponding one of the correction factors, $\Delta_n(i)$, so as to provide corrected return signal component samples.

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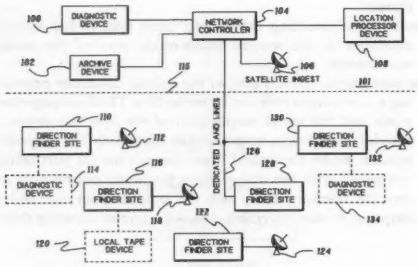
**5,036,334**

## LIGHTNING DIRECTION FINDER CONTROLLER (LDFC)

**Ronald W. Henderson, Albany, N.Y., and Paul Blankenbaker, Cary, N.C., assignors to The Research Foundation of State University of New York, Albany, N.Y.**

**Filed Feb. 8, 1990, Ser. No. 476,935**
**Int. Cl.[5] G01S *3/02*; G01R *31/02***
**U.S. Cl. 342—460** **26 Claims**




1. A lightning direction finder controller for use at a direction finder site in a multi-site lightning detection network, the controller comprising:

first means for receiving and digitizing inputs from an analog direction finder unit located at said site, said inputs representing readings collected by said unit relating to a lightning return stroke detected and reported by said unit to the controller;

second means for processing the digitized inputs and determining therefrom the direction of the lightning return stroke relative to the direction finder site;

third means for determining and associating an absolute time of occurrence with the return stroke, said third means determining the absolute time associated with the return stroke with an accuracy at least as great as $10^{-3}$ second of an absolute time source, said absolute time source comprising a time code broadcast by a satellite, said third means further comprising means for maintaining internal time in said controller and for receiving a satellite clock time signal from a satellite controlled clock located at said site, the satellite controlled clock receiving and decoding the time code broadcast by the satellite and generating a satellite clock time signal generally in synchronism with the time code and representative of satellite clock time, said third means further comprising means responsive to said satellite clock time signal for synchronizing said internal time with satellite clock time; and

fourth means for enabling communication of the direction and the absolute time of occurrence of the lightning return stroke to a remote network controller.

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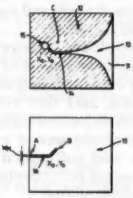
**5,036,335**

## TAPERED SLOT ANTENNA WITH BALUN SLOT LINE AND STRIPLINE FEED

**Hari L. Jairam, Harrow, England, assignor to The Marconi Company Limited, England**

**Filed May 17, 1990, Ser. No. 524,594**
**Claims priority, application United Kingdom, Jun. 9, 1989, 8913311**
**Int. Cl.[5] H01Q *1/38, 13/08***
**U.S. Cl. 343—767** **5 Claims**



1. An antenna arrangement, comprising:

(a) an antenna,

(b) a feed line for said antenna, and

(c) a balun for coupling said antenna with said feed line,

(d) said antenna comprising an electrically insulating planar substrate, an electrically conductive layer carried on a first face of two main faces of said insulating substrate, and a tapered slot formed in said conductive layer, the slot having a narrow end and a broad end,

(e) said feed line comprising an electrically conductive strip carried on a second face of said two main faces of said insulating substrate,

(f) said balun comprising a non-tapered slot line forming an extension of said narrow end of the tapered slot and terminated by an open-circuit termination, and a stripline formed as an extension of said feed line and terminated by a short-circuit termination,

(g) said slot line comprising a first slot line section extending along a first axis and a second slot line section extending in a direction at an angle of 45° to said first axis, the two slot line sections meeting at a first point,

(h) said stripline comprising a first stripline section extending along a second axis and a second stripline section extending in a direction at an angle of 45° to said second axis, the two stripline sections meeting at a second point,

(i) said first point and said second point being substantially coincident in the plane of said insulating substrate.

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**5,036,336**

## SYSTEM FOR THE INTEGRATION OF I.F.F. SUM AND DIFFERENCE CHANNELS IN A RADAR SURVEILLANCE ANTENNA

**Jean Bouko, Villemoisson, and Joseph Roger, Bures sur Yvette, both of France, assignors to Thomson-CSF, Puteaux, France**

**Filed Oct. 23, 1989, Ser. No. 425,814**
**Claims priority, application France, Oct. 28, 1988, 88 14134**
**Int. Cl.[5] H01Q *1/42***
**U.S. Cl. 343—789** **4 Claims**

1. A system for the integration of I.F.F. sum and difference channels in a radar surveillance antenna including a horn type primary source and an offset type reflector illuminated by said primary source, said system comprising:

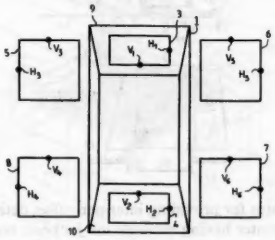
two first radiating elements placed in said horn and forming an I.F.F. sum channel primary source;

four second radiating elements placed two by two on either

side of said horn and forming an I. F. F. difference channel primary source;

first means to combine output signals of said first elements to form I. F. F. sum channel signals; and

second means to combine output signals of said second elements to form I. F. F. difference channel signals, wherein said first and second radiating elements each comprise a first input/output terminal in vertical polarization and a second input/output terminal in horizontal polarization, said first means combine the output signals delivered by said first terminals in vertical polarization of said first radiating elements and said second means com-



bine the output signals delivered by said first terminals in vertical polarization of said second radiating elements, and wherein said system further comprises:

third means to combine the output signals delivered by said second input/output terminals in horizontal polarization of said second radiating elements and give a first neutralizing signal;

a first phase shifter to phase-shift said first neutralizing signal by a first predetermined quantity; and

a first coupler to mix the signal given by said first means and the phase-shifted signal given by said first phase shifter so as to deliver said I.F.F. sum channel signals.

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**5,036,337**

## THERMAL INK JET PRINTHEAD WITH DROPLET VOLUME CONTROL

**Ivan Rezanka, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

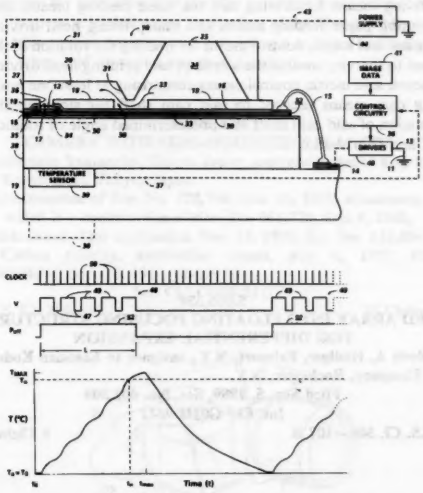
**Filed Jun. 22, 1990, Ser. No. 542,490**
**Int. Cl.[5] B41J *2/05***
**U.S. Cl. 346—1.1** **6 Claims**

5. A method of controlling the volume of an ejected ink droplet from a thermal ink jet printhead having an ink reservoir, plurality of nozzles, and ink flow directing channels providing communication between the nozzles and reservoir, each nozzle having an associated, selectively addressable heating element adapted to produce momentary ink vapor bubbles, when the heating elements are addressed with electrical energy representative of digitized data signals, thereby ejecting an ink droplet from the nozzles, the method comprising:

energizing the heating elements with packets of individual electrical energy pulses instead of single pulses, each packet of pulses representing a unit of digitized data requiring the explosion of an ink droplet, each packet of pulses being sufficient in number to cause the addressed heating element to vaporize instantaneously the ink contacting the heating element;

providing clocking signals having predetermined units per time period;

controlling the number of pulses per packet, based upon a look-up table, with each pulse width and width of spacing between pulses being variable multiple, whole units of clock signals, said look-up table being established to take into account manufacturing tolerance varation, location of the energized heating element within the printhead, and the varying number of heating elements concurrently



energized for simultaneous ejection of plural ink droplets, so that the desired droplet volume is maintained.

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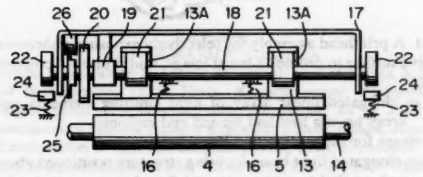
**5,036,338**

## PRINTING HEAD DRIVE APPARATUS WITH INERTIA CONTROL

**Saburo Imai, Tokyo, Japan, assignor to Seiko Instruments Inc., Japan**

**Filed Sep. 29, 1989, Ser. No. 415,124**
**Claims priority, application Japan, Sep. 30, 1988, 63-246569**
**Int. Cl.[5] G01D *15/10***
**U.S. Cl. 346—76 PH** **20 Claims**



1. A color hard copy printer comprising: a printing head; ink sheet feeding means for feeding an ink sheet; printing paper feeding means for feeding printing paper; printing head driving means for driving said printing head toward and away from the ink sheet, said printing head driving means comprising a rotary cam, a one-way clutch connected to rotationally drive the cam, and a printing head support member supporting thereon said printing head and rotatable around a printing head drive shaft; a platen facing said printing head and having a platen shaft arranged in parallel with said printing head drive shaft; printing head lifting means including said rotary cam and one-way clutch and coacting with said printing head support member for moving said printing head around said printing head drive shaft in a direction perpendicular relative to the top surface of said platen between a first position where said print-

ing head is in contact with the top surface of said platen under a predetermined pressure for printing and a second position where said printing head is spaced apart at a predetermined interval from the top surface of said platen, said printing head lifting means including a cam shaft having said rotary cam connected thereto, and a cam member connected to said printing head support member and engageable with said cam; motor driving means for driving said ink sheet feeding means, said printing paper feeding means and said printing head driving means; and inertia control means for braking the rotation of the cam to thereby control the inertia of said printing head driving means, said inertia control means comprising at least one braking cam means secured to said cam shaft for stopping the rotation of said cam shaft at a predetermined angle of rotation of said cam shaft.

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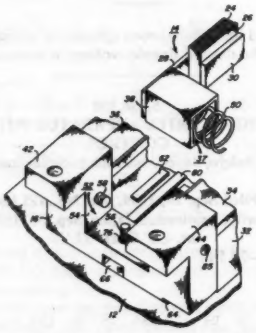
**5,036,339**

## LED ARRAY INTO FLOATING FOCUSING STRUCTURE FOR DIFFERENTIAL EXPANSION

**Edwin A. Hediger, Fairport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Sep. 5, 1989, Ser. No. 402,309**
**Int. Cl.[5] G01D *9/42***
**U.S. Cl. 346—107 R** **8 Claims**



1. A printhead assembly for selectively exposing a photosensitive surface to provide a latent image, said printhead comprising:

an elongated linear array of light emitting elements, said array having first and second end regions;

means for supporting said linear array;

an elongated light beam focusing structure positioned above and parallel to said array, said focusing structure having first and second end regions;

a first support for attaching the first end region of the focusing structure to the array supporting means; and

a second support for attaching the second end region of the focusing structure to the array supporting means;

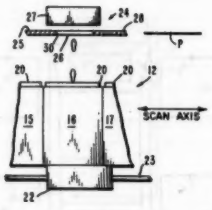
said first and second supports each being movable in a direction across the elongated direction of the focusing structure to align said focusing structure and said array, and providing, after alignment, a floating attachment of the focusing structure with respect to the array, with the floating providing for differential expansion by allowing some relative movement between the focusing structure and the light emitting array at least in a direction parallel to the elongation of the focusing structure.

**5,036,340**

## PIEZOELECTRIC DETECTOR FOR DROP POSITION DETERMINATION IN MULTI-PEN INK JET PRINTING SYSTEMS

**William S. Osborne, Eccondido, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Continuation-in-part of Ser. No. 304,544, Jan. 31, 1989, Pat. No. 4,922,268. This application Mar. 7, 1990, Ser. No. 490,021**
**The portion of the term of this patent subsequent to May 1, 2007, has been disclaimed.**
**Int. Cl.[5] B41J *3/04*; G01D *18/00***
**U.S. Cl. 346—140 R** **10 Claims**




1. Apparatus for providing inter-pen offset determination in an ink jet printer having multiple ink jet pens, comprising:

(a) carriage means for scanning along a print zone in a scan direction;

(b) a plurality of color pens carried by said carriage means and being adapted to fire drops of ink on demand;

(c) position sensing means for indicating a position of said carriage means as it carriage means scans in the scan direction;

(d) piezoelectric detector means having a piezoelectric film for detecting the impact of a drop of ink and being disposed in a coplanar relationship with said print zone;

(e) an opening in said piezoelectric detector means such that ink drops pass therethrough and are not detected until said carriage means scans beyond said opening;

(f) the detect/no detect measurement of drops impacting and not impacting said piezoelectric drop detector means, as the carriage means scans, providing measurement of spacing between pens in the pen scan direction.

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**5,036,341**

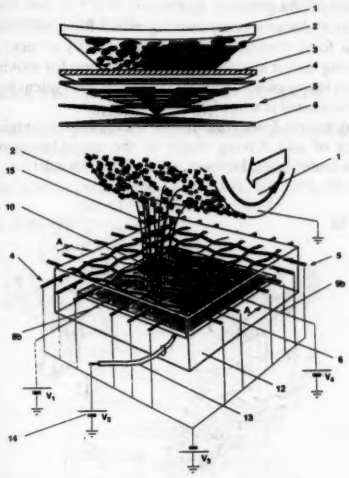
## METHOD FOR PRODUCING A LATENT ELECTRIC CHARGE PATTERN AND A DEVICE FOR PERFORMING THE METHOD

**Ove Larsson, Göteborg, Sweden, assignor to Ove Larsson Production AB, Sweden**

**PCT No. PCT/SE88/00653, § 371 Date Jun. 7, 1990, § 102(e) Date Jun. 7, 1990, PCT Pub. No. WO89/05231, PCT Pub. Date Jun. 15, 1989**
**PCT Filed Nov. 30, 1988, Ser. No. 476,467**
**Claims priority, application Sweden, Dec. 8, 1987, 8704883**
**Int. Cl.[5] G01D *15/06***
**U.S. Cl. 346—154** **15 Claims**

1. A method for producing a latent electric charge pattern from electric signals and developing this on an information carrier by means of pigment particles, characterized therin, that the information carrier (3; 12) is brought to electric cooperation with at least one screen- or lattice-shaped matrix, preferably an electrode matrix (4, 5, 6;4, 61, 62), which due to control in accordance with the configuration of the desired pattern, at least partly opens and closes passages through the

matrix, by means of galvanic connection thereof to at least a voltage source, and that through the passages thus opened is



exposed an electric field for attraction of the pigment particles against the information carrier.

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5,036,342

## FILM CARTRIDGES, FILMS AND CAMERAS ADAPTED FOR USE THEREWITH

Takeo Hoda, Sakai; Nobuyuki Taniguchi, Tondabayashi, and Kiyoshi Seigenji, Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

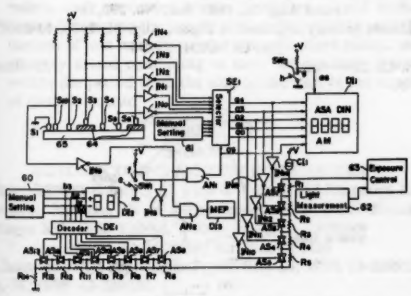
Continuation of Ser. No. 15,677, Feb. 17, 1987, abandoned, which is a division of Ser. No. 796,219, Nov. 8, 1985, Pat. No. 4,676,616, which is a continuation of Ser. No. 546,537, Oct. 28, 1983, Pat. No. 4,588,272, which is a continuation of Ser. No. 385,311, Jun. 4, 1982, Pat. No. 4,431,283. This application Dec. 2, 1987, Ser. No. 127,839

Claims priority, application Japan, Jun. 8, 1981, 56-88625

The portion of the term of this patent subsequent to May 13, 2003, has been disclaimed.

Int. Cl.[5] G03B *7/00*

U.S. Cl. 354—21 11 Claims



1. In a camera adapted for use with a film cartridge having a code pattern in accordance with the APEX values Sv of film speed of a film contained in said film cartridge, a code detection device comprising;

means for reading the code pattern to generate a signal indicative of the film speed represented by said code pattern;

means for detecting whether or not the film cartridge has a code pattern in response to said signal generated by said reading means;

means for changing said signal to a signal indicative of a film speed manually set; and

means for indicating that the film cartridge having the code pattern is loaded when the loading of the film cartridge of this type is detected and providing a warning indication when said changing means is operated.

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5,036,343

## CAMERA WITH SIDE-MOUNTED BALANCER

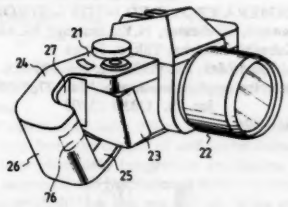
Toshimasa Yamanaka, Tokyo, Japan, assignor to Asahi Kogaku Kogyo K.K., Tokyo, Japan

Continuation of Ser. No. 373,706, Jun. 23, 1989, abandoned, which is a continuation of Ser. No. 241,728, Sep. 8, 1988, abandoned. This application Nov. 15, 1990, Ser. No. 614,554

Claims priority, application Japan, Sep. 6, 1987, 62-136194[U]; Sep. 16, 1987, 62-229700

Int. Cl.[5] G03B *21/14*

U.S. Cl. 354—82 20 Claims



1. A camera system, comprising:

a camera having a camera body and a principal optical axis: and

balancing means mounted on a side of said camera body away from said principal optical axis, with a space for insertion of a hand of an operator holding said camera system during a photographic operation being formed between said balancing means and said side of said camera body, whereby said balancing means balances said holding of said camera system.

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5,036,344

## PHOTOGRAPHIC CAMERA

Manabu Inoue, Kobe; Nobuyuki Taniguchi; Yoshiaki Hata, both of Nishinomiya; Takeo Hoda, Kawachinagano; Yoshinobu Kudo, Sakai, and Hiroshi Ueda, Toyokawa, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 530,433, Jun. 1, 1990, abandoned, which is a continuation of Ser. No. 427,917, Oct. 24, 1989, which is a continuation of Ser. No. 363,295, Jun. 6, 1989, which is a continuation of Ser. No. 160,833, Feb. 26, 1988, which is a division of Ser. No. 21,659, Mar. 4, 1987. This application Nov. 5, 1990, Ser. No. 608,632

Claims priority, application Japan, Mar. 10, 1986, 61-50871; Mar. 10, 1986, 61-50872; Mar. 10, 1986, 61-50873; Mar. 10, 1986, 61-50874; Mar. 10, 1986, 61-52170

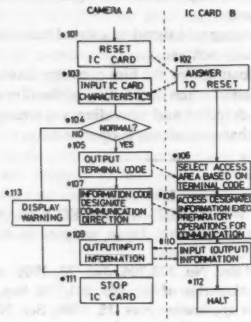
Int. Cl.[5] G03B *17/24, 7/09*

U.S. Cl. 354—106 12 Claims

1. A photographic camera, comprising:

an attaching portion adapted for detachably attaching an IC card including semiconductor memory means capable of reading-out/writing-in, a circuit for communication with peripherals and a data exchange terminal for communication;

communication means for bidirectionally communicating data with said IC card; and




a microcomputer for carrying out camera operations based on data input from said IC card.

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**5,036,345**

**CAMERA PROVIDED WITH A STROBE**

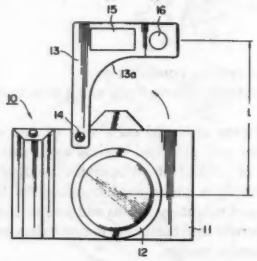
**Kiyoshi Kawano, Rochester, N.Y., assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 23, 1990, Ser. No. 497,919**

**Claims priority, application Japan, Mar. 27, 1989, 1-34636**

**Int. Cl.[5] G03B *15/02***

**U.S. Cl. 354—126** **18 Claims**




1. A camera having a taking lens barrel and including a strobe light element for emitting light when an object is photographed, said strobe light element mounted on an arm member, said arm member rotatable about a pivot shaft between at least a non-operating position wherein said arm member is located along only a portion of a circumferential surface of a taking lens barrel and an operating position wherein said strobe light element is spaced from said taking lens barrel.

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**5,036,346**

**ZOOMING APPARATUS FOR A VIEWFINDER OPTICAL SYSTEM**

**Osamu Hatamori; Yoshiaki Hata; Atsushi Sumitani; Haruo Kobayashi, and Kinya Kato, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Jan. 16, 1990, Ser. No. 465,966**

**Claims priority, application Japan, Jan. 17, 1989, 1-9288; Jan. 30, 1989, 1-21710**

**Int. Cl.[5] G03B *1/18, 13/10***

**U.S. Cl. 354—195.12** **9 Claims**

1. A camera provided with zoom lenses comprising:

a photographing optical system having zoom lenses;

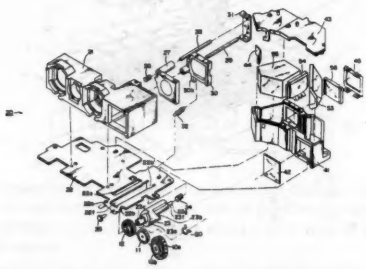
a viewfinder optical system having zoom lenses;

a driving motor for driving the zoom lenses of said photographing optical system and said viewfinder optical system;

first driving force transmitting means for transmitting the force of said driving motor to the zoom lenses of said photographing optical system;

back focal distance compensating means for compensating a back focal distance of the zoom lenses by reversing said driving motor slightly when an operation for moving the zoom lenses of said photographing optical system forward or backward is completed; and

second driving force transmitting means for transmitting the force of said driving motor to the zoom lenses of said viewfinder optical system, which includes a driving mem-



ber constructed to operate in unison with the zoom lenses of said viewfinder optical system so as to move the zoom lenses, driving force transmitting members for transmitting the force of said driving motor to said driving member, a predetermined play having been provided between said driving member and said driving force transmitting member, and restraining means for restraining said driving member from freely rotating while allowing said driving member to be driven by the force of said driving motor, whereby a slight amount of the reverse rotation of said driving motor to be made in the back focal distance compensation of the zoom lenses of said optical system is absorbed by said play so that the operation of said driving member restrained by said restraining means is prevented.

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**5,036,347**

**VISUAL LINE DETECTING DEVICE AND CAMERA HAVING THE SAME**

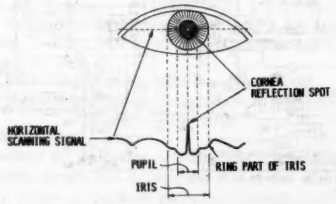
**Tokuichi Tsunekawa; Akihiko Nagano, both of Kanagawa, and Kazuki Konishi, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 14, 1989, Ser. No. 393,594**

**Claims priority, application Japan, Aug. 31, 1988, 63-216674**

**Int. Cl.[5] G03B *13/36***

**U.S. Cl. 354—400** **25 Claims**




1. A visual line detecting device arranged to detect a Purkinje image position of an illuminated eye through light reflected by the eye and to detect the direction of a visual line on the basis of the Purkinje image position and a position of the center of a pupil, comprising:

a) means for estimating a diameter of the pupil of the eye from the luminance of external light; and

b) means for determining said position of the center of the pupil by determining a position of a boundary between the pupil and an iris of the eye on the basis of the estimated diameter of the pupil.

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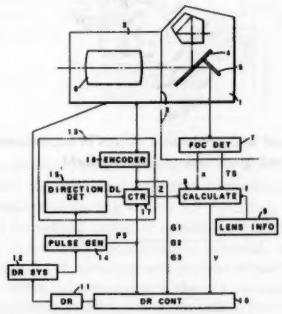
## 5,036,348
## CAMERA SYSTEM HAVING AN AUTOMATIC FOCUS ADJUSTING DEVICE

**Yosuke Kusaka, Yokohama, Japan, assignor to Nikon Corporation, Tokyo, Japan**

**Filed Feb. 21, 1989, Ser. No. 312,660**
**Claims priority, application Japan, Feb. 25, 1988, 63-42792**
**Int. Cl.[5] G03B *3/00, 13/18***
**U.S. Cl. 354—402** **10 Claims**




1. A camera including:

a photo-taking optical system having a focusing lens movable in the direction of the optic axis for focus adjustment;

pulse generating means generating a pulse signal for each predetermined amount of movement of said focusing lens in the direction of the optic axis;

count means for counting said pulse signal;

memory means;

electric power supply means for supplying electric power to said count means, said count means using said electric power in order to operate; and

switch means operated to stop and start the supply of electric power from said electric power supply means to said count means;

said count means being responsive to the operation of said switch means for stopping the supply of electric power to write the content of said count means into said memory means, and responsive to the operation of said switch means for starting the supply of electric power to read the content of said memory means into said count means, said memory means continuing to store the contents thereof within the period from the stop to the start of the supply of electric power.

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## 5,036,349
## AUTOFOCUSING SYSTEM FOR CAMERA

**Noboru Suzuki; Shigeo Toji, both of Tokyo, and Masahiro Kawasaki, Saitama, all of Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Sep. 14, 1989, Ser. No. 407,424**
**Claims priority, application Japan, Sep. 14, 1988, 63-230925; Sep. 14, 1988, 63-230926**
**Int. Cl.[5] G03B *13/36, 5/00***
**U.S. Cl. 354—402** **24 Claims**

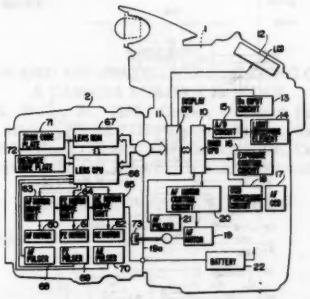
1. An autofocusing system for a camera, wherein a defocus amount is detected with a light-amount-integration type detecting means, in response to which a focusing operation is executed, comprising:

means for driving a photographic lens associated with said camera;

means for detecting a focal length of said photographic lens;

means for outputting a delivery-amount-of-lens conversion factor for converting said defocus amount into a drive amount to drive said photographic lens in compliance with the output of said focal length detecting means;

means for calculating said conversion factor from the outputs of said delivery-amount-of-lens conversion factor outputting means from the time when said integration terminates;




means for determining whether said photographic lens has moved while said light-amount-integration is being executed; and

means for calculating said drive amount of said photographic lens from the output of said factor output means, at the time when said integration terminates, and said defocus amount if said determining means determines that said photographic lens has not moved, while calculating said drive amount of said photographic lens from said conversion factor computed by said factor calculation means and said defocus amount if said determining means determines that said photographic lens has moved.

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## 5,036,350
## CAMERA SYSTEM

**Nobuyuki Taniguchi, Tondabayashi; Masatake Niwa, Sakai; Akira Fujii, Sennan; Takeo Hoda, Sakai; Masaaki Nakai, Kitakatsuragi; Minoru Sekida, Sakai, and Masayoshi Sahara, Sennan, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Division of Ser. No. 309,654, Feb. 13, 1989, Pat. No. 4,947,203, which is a division of Ser. No. 220,066, Jul. 15, 1988, Pat. No. 4,860,046, which is a division of Ser. No. 42,758, Jul. 23, 1986, Pat. No. 4,763,144, which is a division of Ser. No. 888,600, Jul. 26, 1986, Pat. No. 4,712,904, which is a division of Ser. No. 634,474, Jul. 25, 1984, Pat. No. 4,621,914. This application Jun. 18, 1990, Ser. No. 539,439**
**Claims priority, application Japan, Jul. 27, 1983, 58-138129; Jul. 29, 1983, 58-1396000; Aug. 8, 1983, 58-144547; Aug. 8, 1983, 58-144549; Aug. 17, 1983, 58-150572; Jun. 22, 1984, 59-129572; Jun. 25, 1984, 59-131452; Jun. 25, 1984, 59-131453**
**Int. Cl.[5] G03B *17/18***
**U.S. Cl. 354—475** **6 Claims**

1. A camera comprising:

a microprocessor having a chip select terminal for producing a chip select signal to designate a circuit element for receiving a data signal produced by said microprocessor, and a serial output terminal for serially producing one of a plurality of data signals, each of said data signals indicating a value to be indicated and information for controlling an indicating state;

a circuit element having a first terminal connected via said chip select terminal of said microprocessor, and a second terminal connected with said serial output terminal of said

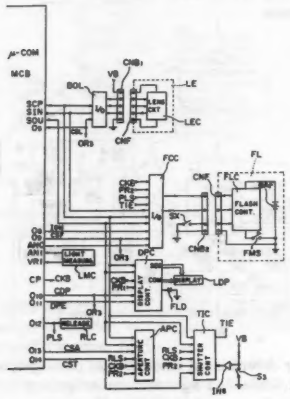
microprocessor, said circuit element being operated when the chip select signal received by the first terminal designates the circuit element, and said circuit element comprising:

a serial register connected with said second terminal for receiving the data signal;

a first decoder connected with said serial register for decoding the value of data represented by the data signal received by the serial register;

a second decoder connected with said serial register for decoding the information represented by the data signal received by the serial register; and

indicating means for indicating the value decoded by said first decoder in accordance with the information decoded by said second decoder.



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**5,036,351**

**EXPOSURE CONTROL PROCESS AND PHOTOGRAPHIC COLOR COPYING APPARATUS**

**Beat Frick, Buchs, and Walter Kraft, Zürich, both of Switzerland, assignors to Gretag Systems, Seattle, Wash.**

**Filed Sep. 28, 1990, Ser. No. 589,799**

**Claims priority, application Switzerland, Sep. 29, 1989, 3550/89**

**Int. Cl.[5] G03B *27/86, 27/32***

**U.S. Cl. 355—38** **29 Claims**

15. Photographic color copying apparatus for reproducing a copy master onto a photosensitive copy material, comprising:

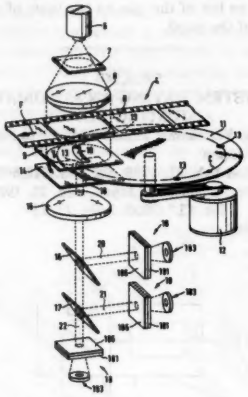
a projection means;

a measuring means for photoelectrically scanning a copy master by areas, said measuring means further comprising a wavelength selective detection device disposed in a beam path of each of three basic colors and detecting each of the basic colors within at least two closely adjacent spectral ranges;

means for converting said detected colors into measured values;

means for combining said measured values to obtain specific color extract values adapted to spectral sensitivity variations of a copy material; and

exposure control means for processing the color extract values to determine quantities of copying light impacting the copying material and for adjusting said measuring means and said projection means in accordance with the determined quantities of copying light.



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**5,036,352**

**MICROFILM PROJECTION APPARATUS HAVING ZOOM LENSES**

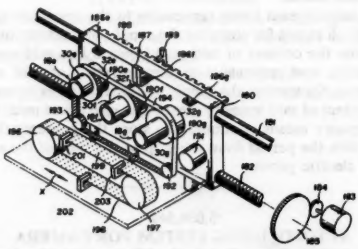
**Kuniaki Kamimura; Kenji Sawada, and Yasushi Yamade, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Continuation of Ser. No. 358,677, May 30, 1989, abandoned. This application Oct. 26, 1990, Ser. No. 604,372**

**Claims priority, application Japan, Jun. 1, 1988, 63-136455; Jun. 8, 1988, 63-139374; Jun. 8, 1988, 63-139375**

**Int. Cl.[5] G03B *13/28***

**U.S. Cl. 355—45** **23 Claims**



1. An image projection apparatus for projecting an image onto an image receiving medium, comprising;

a plurality of zoom lenses having different magnification ranges from each other;

memory means for memorizing a specific magnification corresponding to each zoom lens;

identifying means for identifying the zoom lens selected from the plurality of zoom lenses to be used; and

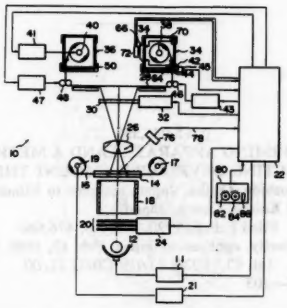
setting means responsive to said identifying means for setting the magnification of the selected zoom lens to the specific magnification memorized by said memory means.

5,036,353

## MAGAZINE FOR PHOTOSENSITIVE MATERIAL

Kiichiro Sakamoto, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jun. 29, 1990, Ser. No. 546,603
Claims priority, application Japan, Jul. 4, 1989, 1-172755; Jul. 4, 1989, 1-172756
Int. Cl.[5] G03B 27/58
U.S. Cl. 355—72 18 Claims



1. A photosensitive material magazine for accommodating a photosensitive material, said magazine comprising:

an information detecting means for detecting information needed for setting exposure conditions which includes at least a type of said photosensitive material, said information being set in a leading end portion of said photosensitive material accommodated therein as well as in one reader member provided in continuation from said leading end portion thereof; and

an output means for outputting an output signal corresponding to said information detected by said information detecting means,

wherein said output means incorporates a display means for displaying items of said information corresponding to said output signal, and said display means includes a display unit visible from an outside surface of said photosensitive material magazine.

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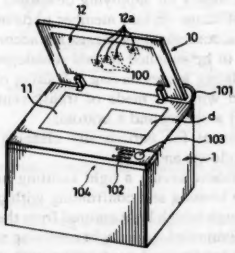
5,036,354

## DOCUMENT SIZE DETECTION DEVICE

Hirohisa Miyamoto, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 11, 1990, Ser. No. 522,187
Claims priority, application Japan, May 11, 1989, 1-117958
Int. Cl.[5] G03B 27/62
U.S. Cl. 355—75 19 Claims



1. A document size detection device comprising:

illuminating means for irradiating a first light on a document on a platen;

projecting means for projecting the first light reflected on the document onto a photosensitive member;

a document cover for covering the document on the platen, said cover having a reflecting area for reflecting the first light emitted from said illuminating means and a non-reflecting area for transmitting the above light;

a document detection sensor provided at a position corresponding to the non-reflecting area and comprising a light emitting element and a light receiving element; and

filter means for transmitting a second light from the light emitting element as well as guiding the first light emitted from said illuminating means to said projecting means, said filter means being opposed to a detecting surface of said sensor.

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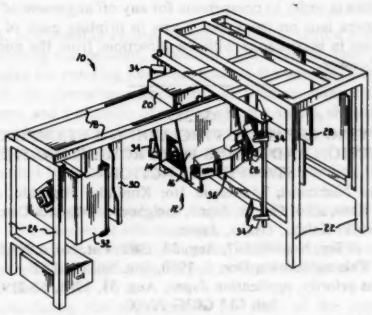
5,036,355

## METHOD AND APPARATUS FOR LOCATING COPY ON A CAMERA SUBJECT HOLDER

Joseph H. Wally, Jr., 11517 Conser, Overland Park, Kans. 66210; Arlen C. Elkins, 7225 Pennsylvania Ave., Kansas City, Mo. 64114; Ron L. Halsey, 4115 Castleford Dr., Colfax, N.C. 27235, and Herbert W. Pace, 510 W. 5th St., Kansas City, Mo. 64105

Filed Aug. 2, 1990, Ser. No. 561,884
Int. Cl.[5] G03B 27/62
U.S. Cl. 355—75 11 Claims



1. A method of accurately positioning copy on a subject holder for photographing of the copy by a main camera, said method the steps of:

providing an auxiliary camera/projector having a camera mode of operation and a projection mode of operation;

mounting a template on the subject holder at a preselected position indicative of the position the copy is to occupy during photographing thereof;

photographing said template with said auxiliary camera/-projector in the camera mode to obtain a film image of the template;

using said auxiliary camera/projector in the projection mode to project said film image of the template onto said subject holder at said preselected position; and

applying the copy to the subject holder using the projected image of the template as a guide indicating the position the copy is to occupy.

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5,036,356

## 3-D CAMERA, PRELOADED AND INTEGRATED HIGH-SPEED PRINTING SYSTEM

Allen K. W. Lo, 5022 Hidden Branches Dr., Dunwoody, Ga. 30338

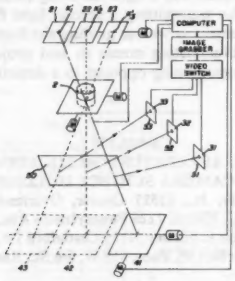
Filed Mar. 27, 1990, Ser. No. 499,665
Int. Cl.[5] G03B 35/14, 27/32
U.S. Cl. 355—77 8 Claims

1. A method for compensating for any off alignment of the

lenses in a 3-D camera in the printing of 2-D views which comprises:

a. Exposing the first set of 2-D views of the film in the camera to a target at a predetermined distance;

b. Projecting the first set of 2-D views in a 3-D printer with an image processor to determine the x and y axis of each of the images in the printing plane of the printer; and




c. Entering the x and y coordinates of each of the projected images into a microprocessor programmed to automatically adjust the position of each subsequent 2-D view in each set of 2-D views to the desired position by moving means in order to compensate for any off alignment of the camera lens on the x and y axis in printing each of the views in accordance with the directions from the microprocessor.

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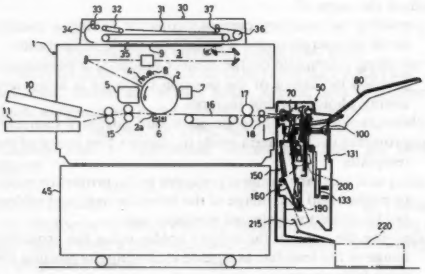
**5,036,357**

## COPYING APPARATUS INCLUDING A STAMPING FUNCTION AND MEANS FOR PROHIBITING THE STAMPING FUNCTION

**Kadotaro Nishimori; Masazumi Ito; Kimihiko Higashio, and Akio Kato, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Division of Ser. No. 400,867, Aug. 30, 1989, Pat. No. 4,994,865.**
**This application Dec. 4, 1990, Ser. No. 621,881**
**Claims priority, application Japan, Aug. 31, 1988, 63-219294**
**Int. Cl.[5] G03G *21/00***
**U.S. Cl. 355—202** **9 Claims**



1. A copying apparatus, comprising:

an image forming means for forming an image on a sheet of copy paper;

a stamping means for accommodating a number of copy paper sheets on which image is formed and stamping a predetermined stamp on the paper, the stamping means being capable of accommodating a predetermined number of copy paper sheets;

a discharging means for accommodating a copy paper on which image is formed without stamping process;

a transporting means for selectively forwarding the image formed copy paper sheets either to the stamping means or to the discharging means; and

a control means for controlling the transporting means so as to transport succeeding copy paper sheets to the discharging means when the number of copy paper sheets accommodated in the stamping means have reached the predetermined number of sheets.

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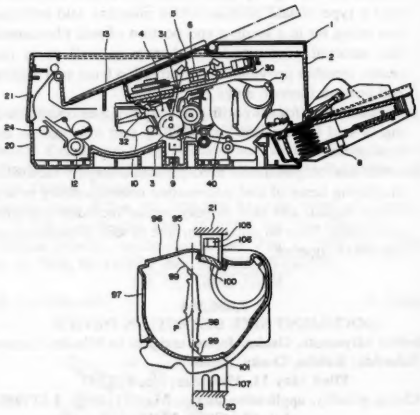
**5,036,358**

## IMAGE-FORMING APPARATUS AND A METHOD FOR A DETECTING DEVELOPER AMOUNT THEREIN

**Narutaka Yoshida, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Feb. 8, 1990, Ser. No. 476,686**
**Claims priority, application Japan, Feb. 10, 1989, 1-31823**
**Int. Cl.[5] F03G *15/08*; G03G *21/00***
**U.S. Cl. 355—203** **12 Claims**



1. An image-forming apparatus comprising:

a photosensitive member;

a developing means for supplying developer on an electrostatic latent image on said member to develop it;

a developer accommodating means for accommodating the developer to be supplied to said developing means, said accommodating means having a housing of which a first and second windows made of transparent members are arranged at a ceiling and a bottom;

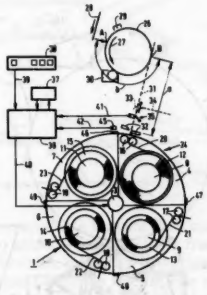
a cleaning means for periodically cleaning the first and second windows; and

a detecting means having a light emitting means arranged outside the housing and confronting with one of the windows, through which light emitted from the light emitting means is illuminated, and a light receiving means arranged outside the housing and confronting with the other of the windows, which receives the light emitted from the light emitting means to detect an amount of the developer in the housing.

## 5,036,359
## METHOD AND APPARATUS FOR SUPPLYING MATERIAL IN WEB FORM

Johan A. Duijve, Venlo, and Gijsbertus Velraeds, Baarlo, both of Netherlands, assignors to Oce-Nederland B.V., Netherlands

Filed Dec. 19, 1989, Ser. No. 452,777
Claims priority, application Netherlands, Dec. 21, 1988, 8803121
Int. Cl.[5] G03G *15/00*; B65H *19/00*
U.S. Cl. 355—203 7 Claims

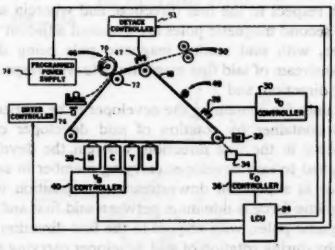


1. A method for automatically and selectively supplying material in web form of different widths from one of a plurality of storage locations in a common path, comprising:
(a) feeding a part of the stored material web into said common path;
(b) measuring the width of said part and generating a signal representative of the storage location from which said part originates;
(c) determining a data item representative of the measured width and the signalled storage location; and
(d) removing from said common path the supplied part of the material web.

## 5,036,360
## MOISTURE COMPENSATION FOR ELECTROSTATOGRAPHIC APPARATUS

James F. Paxon, and Duane J. Schommer, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 21, 1990, Ser. No. 482,612
Int. Cl.[5] G03G *21/00*
U.S. Cl. 355—208 9 Claims

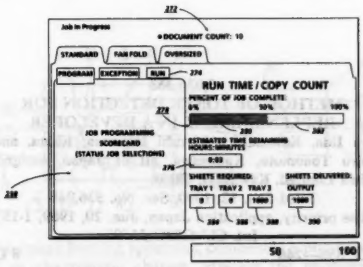



1. An electrostatographic reproduction apparatus comprising:
an image member;
means for transferring a toner image from said image member to a receiver sheet by applying a voltage between said image member and the receiver sheet in a direction urging the toner image to the receiver sheet and of a value characteristic of the ambient relative humidity in the apparatus; and
means responsive to the value of said voltage for automatically adjusting the value of at least one electrostatographic process element.

## 5,036,361
## JOB REQUIREMENTS CALCULATION AND DISPLAY

Joseph L. Filion; Douglas F. Sundquist, both of Rochester; Paul F. Schmitt, Palmyra; Eugene S. Evanitsky, and Riley L. Warddrip, both of Pittsford, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Mar. 21, 1990, Ser. No. 500,840
Int. Cl.[5] G03G *15/00, 21/00*
U.S. Cl. 355—209 8 Claims

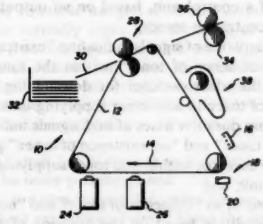



1. In a printing system having a machine with a plurality of operating components, a control with operator interface and display for entering job requirements, the control cooperating with the operating components to produce images on copy sheets, and a plurality of sources of copy sheets, the method of providing the time of completion for a given job requirement and providing an indication of the number of copy sheets required from each source of copy sheets including the steps of:
calculating the number of documents in a document set and the number of sets required,
determining whether or not the job is in progress,
graphically displaying the percentage completion of the job, and
calculating the requirements for each of the copy sheet sources, and
displaying the number of sheets required from each of the sources.

## 5,036,362
## SEQUENTIAL DEVELOPMENT WITH MAGNETIC AND NON-MAGNETIC TONER

Eric C. Stelter, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 28, 1990, Ser. No. 545,165
Int. Cl.[5] G03G *15/06*
U.S. Cl. 355—245 5 Claims



1. An electrostatographic reproduction apparatus comprising:

an image transfer member;

means for producing an electrostatic latent image on said image transfer member;

a first development station adapted to develop small details, lines, and the edges of solid areas of said latent image with magnetic toner; and

a second development station adapted to develop the inside of solid areas of said latent image with non-magnetic toner.

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**5,036,363**

## METHOD OF TONER DETECTION FOR REPLENISHMENT IN A DEVELOPER

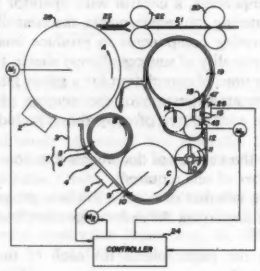
**Masaru Iida, Kawasaki; Akiyoshi Iwamasa, Ebina, and Yoshihiro Tonomoto, Kanagawa, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Jun. 12, 1990, Ser. No. 536,845**

**Claims priority, application Japan, Jun. 20, 1989, 1-157938**

**Int. Cl.[5] G03G *21/00***

**U.S. Cl. 355—246** **8 Claims**




1. A method of detecting toner in a toner supplying unit of a developing unit provided to develop a latent image formed on an image carrier with the toner, wherein said toner supplying unit includes a toner detector having a toner detecting surface in contact with toner therein, a toner supplying roller driven by a motor, and a detecting surface cleaning means fixed to a rotating shaft of said toner supplying roller and rotating therewith to remove toner from the detecting surface, said method comprising the steps of:

detecting toner concentration in a stirring unit of said developing unit with a concentration sensor;

controlling drive of said toner supplying roller for supplying toner to said stirring unit from the toner supplying unit by means of a control unit, based on an output signal from said concentration sensor;

generating any one of signals indicating "existence of toner" and "no-existence of toner" within the toner supplying time by the toner detector for determining a remaining amount of toner in said toner supplying unit;

accumulating duration times of said signals indicating "existence of toner" and "no-existence of toner" generated by the toner detector within said toner supplying times in the control unit; and

detecting one of an "existence of toner" and "no-existence of toner" condition based on the duration of times of said toner detector output signals accumulated by the control unit within said toner supplying time.

**5,036,364**

## IMAGE FORMING APPARATUS INCLUDING DEVELOPER CARRYING MEMBER HAVING REPELLING MAGNETIC BRUSH

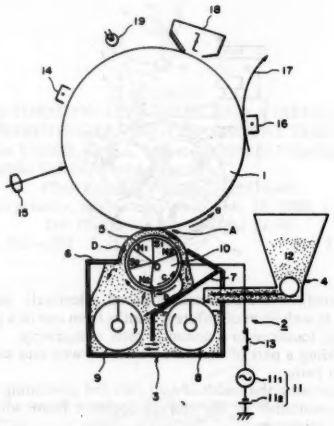
**Yoshihiro Murasawa, Sagamihara, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 18, 1989, Ser. No. 381,307**

**Claims priority, application Japan, Jul. 22, 1988, 63-18249**

**Int. Cl.[5] G03G *15/09***

**U.S. Cl. 355—251** **24 Claims**



1. An image forming apparatus, comprising:

a movable image bearing member;

means for forming an electrostatic latent image on said image bearing member; and

developing means for developing the latent image, said developing means comprising:

a developer carrying member rotatable in a first direction to carry a developer to a developing zone to develop the electrostatic latent image and rotatable in a second direction opposite to the first direction for a predetermined period when the latent image is not being developed;

a stationary magnet disposed in said developer carrying member, wherein said magnet has a first magnetic pole and a second magnetic pole having the same magnetic polarity at positions downstream of the developing zone with respect to the first direction, and wherein said first and second magnetic poles are disposed adjacent to each other, with said second magnetic pole being disposed downstream of said first magnetic pole with respect to the first direction; and

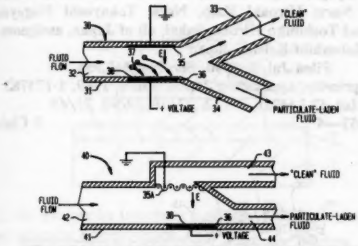
a container for containing the developer to be carried out of said container by rotation of said developer carrying member in the first direction, wherein the developer is supplied to said developer carrying member in said container at a position downstream of a position where a magnetic force is minimum between said first and second magnetic poles, with respect to the first direction,

whereby during rotation of said developer carrying member in the first direction, the developer having passed through the developing zone is removed from said developer carrying member by means of a repelling magnetic force formed between said first and second magnetic poles, and whereby during rotation of said developer carrying member in the second direction, the developer on said developer carrying member is removed from said developer carrying member by means of the repelling magnetic force so that the developer is not carried to the developing zone.

## 5,036,365
## FIELD ASSISTED FILTER AND ELECTROPHOTOGRAPHIC COPYING MACHINE USING THE SAME

Benzion Landa, 10010-119 St., Edmonton, Alberta, Canada

Filed Nov. 21, 1988, Ser. No. 273,831
Int. Cl.[5] G03G 15/10; B01D 17/06
U.S. Cl. 355—256 21 Claims




1. A filter for separating a flowing fluid containing charged particles into two streams, one essentially free of particles and one laden with particles, said filter comprising:

a) a main conduit having an inlet at one end for receiving said flowing fluid and having two outlets downstream of said one end for dividing the flow into two outlet flow paths;

b) a pair of electrodes between which the fluid is adapted to flow and located upstream of the outlets, each outlet being associated with a respective electrode;

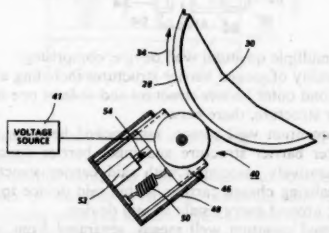
c) voltage sources connected to the electrodes such that one is more positive than the other for establishing, in the fluid flowing between the electrodes, a unidirectional electric field having a having a component transverse to the direction of flow whereby particles in the field are attracted toward one of said electrodes and travel into the outlet associated therewith; and

d) inhibition means associated with said one electrode for inhibiting plating-out of particles on said one electrode while fluid flows in the conduit.

## 5,036,366
## LIQUID INK METERING ROLL

Eric Berg, Chadds Ford, and Edward B. Caruthers, Jr., West Chester, both of Pa., assignors to Xerox Corporation, Stamford, Conn.

Filed Jan. 8, 1990, Ser. No. 462,168
Int. Cl.[5] G03G 15/10
U.S. Cl. 355—256 15 Claims




11. An apparatus for eliminating excess liquid material coated on a surface, including:

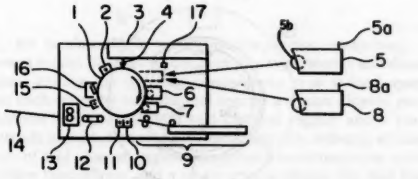
means, movable between a non-operative position, remote from the surface, and an operative position, closely adjacent the surface, for removing the excess liquid material from the surface; and

means for applying an electrical bias to said removing means as said removing means moves from the non-operative position to the operative position to attract liquid material from the liquid material coated on the surface to said removing means.

## 5,036,367
## COLOR IMAGE FORMING APPARATUS

Satoshi Haneda; Hisashi Shoji, and Kunihisa Yoshino, all of Hachioji, Japan, assignors to Konica Corporation, Tokyo, Japan

Continuation of Ser. No. 268,160, Nov. 7, 1988, abandoned. This application Sep. 13, 1989, Ser. No. 406,849
Int. Cl.[5] G03G 15/01, 15/08
U.S. Cl. 355—260 12 Claims




1. An image forming apparatus, comprising a photosensitive body, an electrostatic charger adjacent the photosensitive body, an image exposure means for forming on a charged surface of the photosensitive body an electrostatic image corresponding to signals representing a particular image, multiple developing means having respective multiple color toners to produce a toner image for the electrostatic image obtained with the image exposure means for at least one color of the multiple color toners, and a transfer means for transferring the toner image onto a transfer material; said multiple developing means comprising a plurality of first developing means placed in an installed position for respectively storing the multiple color toners, second developing means for storing a black toner, and means for selectively placing the second developing means in the installed position of at least one of said plurality of first developing means.

## 5,036,368
## ELECTROMAGNETIC COUPLING DEVICE

Hiroaki Nakamura, Ise, Japan, assignor to Shinko Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 11, 1990, Ser. No. 625,428
Int. Cl.[5] H01H 7/08, 7/14; F16D 19/00
U.S. Cl. 335—272 3 Claims

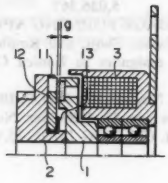
1. An electromagnetic coupling device comprising: an input shaft hub, an output shaft hub, an electro-magnet disposed at the side of said input shaft hub, a ring shaped armature disposed around the outer surface of said output shaft hub and axially between said input shaft hub and said output shaft hub and is coupled to said output shaft hub through a spline coupling means so as to be axially movable relative to said output shaft hub and rotatable integral with said output shaft hub, a spring which normally urges said armature so as to be kept spaced apart from said input shaft hub with a gap of predetermined extent and allows said armature to be attracted toward said input shaft against its spring force; wherein,

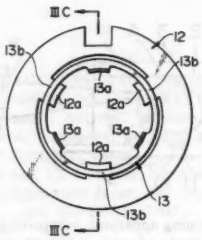
said ring shaped armature is formed to have a plurality of radially and inwardly directed projections extending from the inner periphery,

said output shaft hub is formed to have an annular groove around its outer periphery, and

said spring is a ring shaped flat spring having, a plurality of axially bent protrusions formed along the inner periphery and is able to be fitted into said annular groove of said output shaft hub, and a plurality of intermediate flat por-

tions of the spring bridging each two adjacent protrusions capable of being engaged with each of said radially extending projections of said armature so as to be urged by




said projections toward said input shaft hub to effect spring action to said armature either when said electromagnet is excited or not.

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**5,036,369**

**IMAGE FORMING APPARATUS**

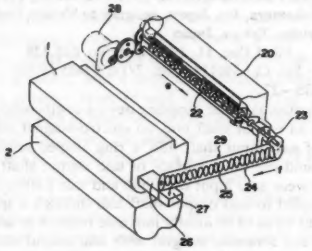
**Kunio Toda; Tomoaki Yokoyama, and Taisuke Nagao, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaska, Japan**

**Filed Jun. 29, 1989, Ser. No. 372,817**

**Claims priority, application Japan, Jun. 30, 1988, 63-162865; Jun. 30, 1988, 63-162866**

**Int. Cl.[5] G03G *21/00***

**U.S. Cl. 355—298** **14 Claims**




1. An image forming apparatus comprising:

a photosensitive member supported to rotate in one direction;

a first developing means accommodating a developer in a specified color and set to develop an electrostatic latent image reproduced as a solid;

a second developing means arranged at a downstream side of said first developing means in the one direction of said member, said second developing means accommodating a developer in the same color as that in said first developing means and being set to develop an electrostatic latent image reproduced as a line;

a cleaning means for collecting the developer remaining on a surface of said member; and

a developer transporting means for transporting the developer collected by said cleaning means to said first developing means.

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**5,036,370**

**THIN FILM SEMICONDUCTOR ARRAY DEVICE**

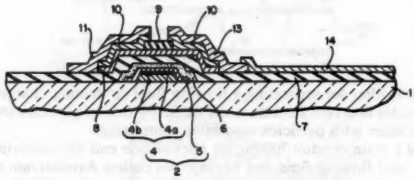
**Makoto Miyago, Higashiosaka; Hiroshi Oka, Shiki; Akihiko Imaya, Nara; Hiroaki Kato, Nara; Takayoshi Nagayasu, Nara, and Toshihiko Hirobe, Sakai, all of Japan, assignors to Sharp Kabushiki Kaisha, Japan**

**Filed Jul. 2, 1990, Ser. No. 545,955**

**Claims priority, application Japan, Jul. 4, 1989, 1-173783**

**Int. Cl.[5] H01L *27/12, 27/01, 29/78, 23/48***

**U.S. Cl. 357—4** **3 Claims**




1. A thin film transistor array device having a gate wiring on an insulating substrate, the gate wiring comprising an inner gate wiring having a first metal layer formed on the insulating substrate and a second metal layer whose etching speed is faster than that of the first metal layer, the first metal layer and the second metal layer being overlapped so as to constitute a dual structure, and an outer gate wiring covering the inner gate wiring.

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**5,036,371**

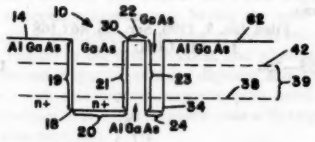
**MULTIPLE QUANTUM WELL DEVICE**

**Carey Schwartz, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Sep. 27, 1989, Ser. No. 413,025**

**Int. Cl.[5] H01L *29/161, 29/205, 29/225, 27/12***

**U.S. Cl. 357—16** **25 Claims**




1. A multiple quantum well device, comprising:

a plurality of spaced barrier structures including a first and second outer barrier structure and at least one inner barrier structure, there-between;

first quantum well means, sandwiched between said first outer barrier structure and inner barrier structure and operatively associated with said barrier structures, for localizing charge carriers within said device to establish the ground energy state of said device;

a second quantum well means, separated from, narrower than, and quantum coupled to said first quantum well means, and operatively associated with said barrier structures for localizing charge carriers within said device to establish energy levels comprising an energy band above said ground energy state; and

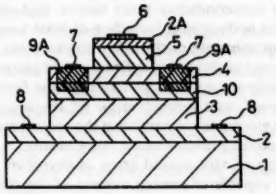
means affixed to said device for connecting it to an electrical circuit.

5,036,372

## HETEROJUNCTION AVALANCHE TRANSISTOR

Toshiyuki Ohishi; Yuji Abe; Hiroshi Sugimoto; Ken-ichi Ohisuka, and Teruhito Matsui, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Sep. 10, 1990, Ser. No. 579,681
Claims priority, application Japan, Sep. 11, 1989, 1-232883
Int. Cl.[5] H01L *29/161*
U.S. Cl. 357—16 3 Claims




1. An avalanche transistor having a heterojunction emitter-base junction comprising:

an emitter layer having an energy band gap;

a base layer having an energy band gap and a charge carrier concentration; and

a spacer layer disposed between said emitter layer and said base layer having an energy band gap between that of said base layer and that of said emitter layer, a carrier concentration lower than that of said base layer, and a thickness for complete depletion at thermal equilibrium and for producing a neutral region in said spacer layer at a voltage lower than a threshold voltage of said emitter-base junction.

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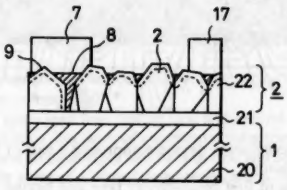
5,036,373

## ELECTRIC DEVICE WITH GRAINS AND AN INSULATING LAYER

Shunpei Yamazaki, Tokyo, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Japan

Filed Apr. 24, 1990, Ser. No. 513,870
Claims priority, application Japan, Jun. 1, 1989, 1-140527; Jun. 1, 1989, 1-140528
Int. Cl.[5] H01L *33/00*
U.S. Cl. 357—17 19 Claims




1. A diamond electric device comprising:

a substrate;

a diamond film formed on said substrate and consisting of a number of diamond crystals grown from said substrate and closely arranged to each other to form recessses into which boundaries between said diamond crystals terminate;

an insulator filling the recesses of said diamond film in order that said diamond crystals project their top surfaces beyond said coating; and

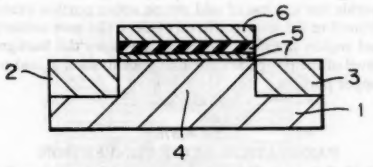
an electrode arrangement formed on said diamond film over said insulating coating.

5,036,374

## INSULATED GATE SEMICONDUCTOR DEVICE USING COMPOUND SEMICONDUCTOR AT THE CHANNEL

Masafumi Shimbo, Tokyo, Japan, assignor to Seiko Instruments Inc., Japan

Filed Apr. 11, 1988, Ser. No. 180,359
Claims priority, application Japan, Apr. 9, 1987, 62-87370
Int. Cl.[5] H01L *29/20, 29/78, 29/161, 21/20*
U.S. Cl. 357—23.2 18 Claims




1. An insulated gate semiconductor device comprising: a channel region having one conductivity type; source and drain regions having the opposite conductivity type spaced apart from each other by said channel region; a silicon dioxide gate insulation film provided on said channel region; and a gate electrode provided on said gate insulation film; wherein at least a part of said channel region comprises a semiconductor crystal other than silicon, and a single crystal silicon thin film less than 100 atoms thick being provided between said channel region and said gate insulation film.

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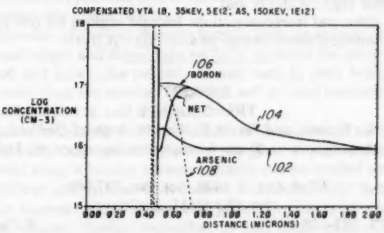
5,036,375

## FLOATING-GATE MEMORY CELL WITH TAILORED DOPING PROFILE

Allan T. Mitchell, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 889,454, Jul. 23, 1986, Pat. No. 4,979,005. This application Oct. 22, 1990, Ser. No. 601,161
Int. Cl.[5] H01L *29/68, 29/10, 29/78, 29/04*
U.S. Cl. 357—235 4 Claims




1. A floating-gate memory device comprising peripheral transistors and memory transistors, said peripheral transistors comprising n-channel devices, said memory transistors formed on a substrate having a p-type upper portion, said memory transistors each comprising:

first and second heavily doped n-type source/drain regions separated to define a channel region in said p-type upper portion;

a gate oxide overlying said channel region and a floating gate overlying said gate oxide;

a control gate overlying and insulated from said floating gate, wherein

the largest value of the net p-type dopant concentration anywhere within the volume of said p-type upper portion extending from 0 to 0.5 micron directly below the interface between said gate oxide and said channel region is more than 1.5 times the net p-type dopant concentration in said channel region at the interface between said gate oxide and said channel region,

the maximum value of the net p-type dopant concentration within the upper portion of said substrate occurs at a depth which is shallower than the depth of said source/-drain diffusions,

the background value of the net p-type dopant concentration within the upper portion of said substrate near said memory transistors is greater than the background value of the net p-type dopant concentration within the upper portion of said substrate near said channel peripheral transistors, and

the largest value of the net p-type dopant concentration, within the volume of said p-type upper portion extending from 0 to 0.5 micron directly below the gate oxide-channel region interface, is nearly ten times the background level of the p-type net dopant concentration in said p-type upper portion.

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**5,036,376**

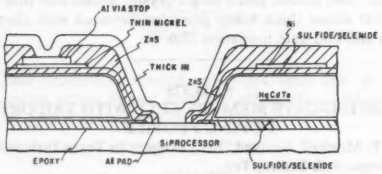
**PASSIVATION OXIDE CONVERSION**

**Towfik H. Teherani, Plano, and D. Dawn Little, Euless, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Continuation of Ser. No. 824,897, Jan. 31, 1986. This application Jul. 27, 1988, Ser. No. 225,597**

**Int. Cl.[5] H01L** *27/14, 29/34, 29/06*

**U.S. Cl. 357—30** **3 Claims**




1. A infrared detector array, comprising:

(a) a plurality of $Hg_{1-x}Cd_xTe$ photosensitive regions:

(b) a passivation layer on said $Hg_{1-x}Cd_xTe$, said passivation layer a sulfide or selenide of $Hg_{1-x}Cd_xTe$ and characterized by conversion of all of an oxide layer formed from said $Hg_{1-x}Cd_xTe$; and

(c) gates and interconnections for said regions for detecting photogenerated charge in said $Hg_{1-x}Cd_xTe$.

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**5,036,377**

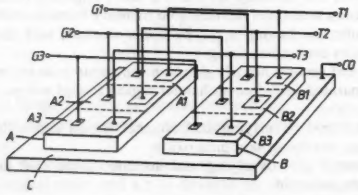
**TRIAC ARRAY**

**Vijay K. Pathak, and David R. Cotton, both of Bedford, England, assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Aug. 3, 1988, Ser. No. 227,961**

**Int. Cl.[5] H01L** *29/74*

**U.S. Cl. 357—38** **8 Claims**




1. A semiconductor arrangement comprising:

first semiconductor body means having first and second major surfaces, said first semiconductor body means including at least a first semiconductor substrate of one conductivity type;

a first array of thyristors defined in said first semiconductor body means and opening onto the first major surface thereof, said first array of thyristors having a common electrode connection at the second major surface of said first semiconductor body means;

the thyristors of said first array of thyristors being controllably capable of passing current of one polarity to the common electrode connection at the second major surface of said first semiconductor body means;

second semiconductor body means having first and second major surfaces and being independent of and spaced from said first semiconductor body means, said second semiconductor body means including at least a second semiconductor substrate of the other conductivity type;

a second array of thyristors defined in said second semiconductor body means and opening onto the first major surface thereof, said second array of thyristors having a common electrode connection at the second major surface of said second semiconductor body means;

the thyristors of said second array of thyristors being controllably capable of passing current of the other polarity to the common electrode connection at the second major surface of said second semiconductor body means;

means joining the common electrode connection of said first array of thyristors to the common electrode connection of said second array of thyristors; and

interconnection means connecting thyristors of said first array of thyristors in parallel with corresponding thyristors of said second array of thyristors to define an array of triacs, said interconnection means including a single gate connection respectively connecting the corresponding thyristors in said first and second arrays of thyristors for each respective one of said triacs included in said array of triacs.

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**5,036,378**

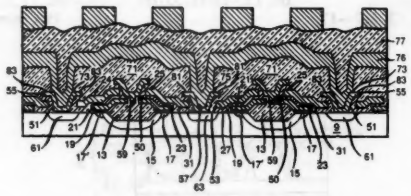
**MEMORY DEVICE**

**Chih-Yuan Lu, Lower Macungie Township, Lehigh County, and Tah-Kang J. Ting, Upper Macungie Township, Lehigh County, both of Pa., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Nov. 1, 1989, Ser. No. 430,390**

**Int. Cl.[5] H01L** *29/78*

**U.S. Cl. 357—23.5** **3 Claims**



1. A semiconductor device comprising a pair of EEPROM cells comprising

a substrate of first conductivity type and having a surface:

a thermal oxide region overlying said substrate and penetrating into said substrate and having an oxide surface extending beyond the said surface of said substrate;

a first junction region of second conductivity type underlying said oxide region;

second and third junction regions, on opposite sides of said first junction region, both said second and third junction regions contacting said substrate surface, said first junction region and said second junction region defining a first channel and said first junction region and said third junction region defining a second channel;

fourth and fifth junction regions, both of first conductivity type, said fourth junction region being between said first

junction region and said second junction region and said fifth junction region being between said first junction region and said third junction region;

first and second floating gates, each at least partially overlying said respective first and second channels and each at least partially overlying said oxide region;

first and second control gates each at least partially overlying said respective first and second channels, and each at least partially overlying said respective first and second floating gates;

an erase gate overlying said oxide region and overlying at least portions of said first and second floating gates;

first and second landing pads, said first landing pad contacting said second junction region and said second landing pad contacting said third junction, each of said landing pads having a protusion extending from said contacted junction region and overlying one of said channels;

a patterned conductive runner contacting at lease one of said landing pads.

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**5,036,379**

## ELECTRICAL INTERCONNECT TAPE

**Robert T. Smith, Round Rock, and Chang-Hwa Chung, Austin, both of Tex., assignors to Microelectronics and Computer Technology Corporation, Austin, Tex.**

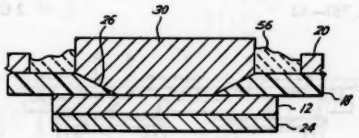
**Continuation-in-part of Ser. No. 96,866, Sep. 14, 1987. This application Jun. 27, 1989, Ser. No. 371,946**

**Claims priority, application United Kingdom, Oct. 11, 1986, 8626828**

**The portion of the term of this patent subsequent to Aug. 22, 2006, has been disclaimed.**

**Int. Cl.[5] H01L** *23/495*

**U.S. Cl. 357—69** **20 Claims**




1. An electrical interconnect tape for connecting two electrical members comprising,

a flexible beam lead tape having first and second edges, said tape having a first layer of electrical conductors extending transverse to said edges and having first and second ends, a middle layer of a dielectric material, and a third electrical ground layer, said first ends of the first layer of electrical conductors being adjacent to the first edge and said second ends of the first layer of electrical conductors being adjacent to the second edge,

vias extending through the dielectric layer at the first and second ends of the first layer of electrical conductors, each of said vias aligned with one of said first layer of electrical conductors,

an electrical connection between at least one of the ends of the first layer of electrical conductors and the ground layer through a via,

a raised electrical pad, and

means for aligning the tape with a substrate to which the tape will be interconnected.

**5,036,380**

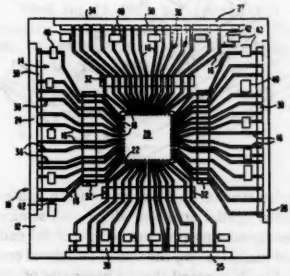
## BURN-IN PADS FOR TAB INTERCONNECTS

**Richard A. Chase, Boylston, Mass., assignor to Digital Equipment Corp., Maynard, Mass.**

**Continuation of Ser. No. 173,094, Mar. 28, 1988, abandoned. This application May 7, 1990, Ser. No. 518,335**

**Int. Cl.[5] G01R** *31/02;* **H01L** *39/02*

**U.S. Cl. 357—70** **17 Claims**



1. A semiconductor device TAB interconnect tape having an upper surface and a lower surface, and carrying a printed circuit interconnect conductor array, comprising:

a tape having an upper surface, a lower surface, and a central aperture;

a multiplicity of signal, power and ground interconnect conductors on said tape upper surface, each conductor having a first, inner end and a second, outer end portion, said multiplicity of conductors including at least 300 conductors, with the inner ends thereof being positioned in a high-density, side-by-side array and arranged for connection to corresponding signal, power and ground contacts positioned in a high-density arrangement on a semiconductor integrated circuit device, said signal, power and ground interconnect conductors of said array being fanned outwardly from said central aperture on said upper surface to position said conductor outer end portions at a relatively lower density;

a plurality of spaced, discrete burn-in pads on at least one of said upper and lower tape surfaces adjacent the periphery of said array, the number of said burn-in pads being no more than the number of power and ground interconnect conductors in said array; and

means connecting said burn-in pads to the outer end portions of only corresponding power or ground conductors of said array whereby burn-in voltages can be applied to said power and ground interconnect conductors and thereby to corresponding power and ground contacts of a semiconductor device connected to said inner ends of said interconnect conductors.

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**5,036,381**

## MULTIPLE ELECTRONIC DEVICES WITHIN A SINGLE CARRIER STRUCTURE

**Paul T. Lin, Austin, Tex., assigaor to Motorola, Inc., Schaumburg, Ill.**

**Filed Jun. 15, 1990, Ser. No. 538,629**

**Int. Cl.[5] H01L** *23/48, 29/44, 29/52, 29/60*

**U.S. Cl. 357—70** **13 Claims**

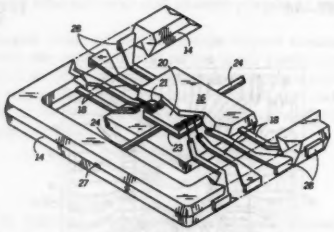
1. Packaged semiconductor devices within one carrier structure, comprising:

a leadframe having a plurality of semiconductor die receiving areas, each having a plurality of leads on at least two sides of said receiving areas and extending therefrom, each lead having a proximal end near said receiving area and a distal end away from said receiving area, said receiving areas collectively occupying a bounded spatial area;

a semiconductor die located in each of said plurality of

receiving areas and electrically coupled to said proximal ends of said plurality of leads;

package bodies encapsulating each of said semiconductor die and said coupled, proximal ends of said plurality of leads; and



a single carrier structure spaced apart from and encircling said bounded spatial area and all of said semiconductor die, and encapsulating portions of said distal ends of said plurality of leads, leaving the tips of said distal ends of said plurality of leads exposed along a perimeter of said carrier structure for electrical access to each of said semiconductor die in each of said receiving areas.

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**5,036,382**

**SEMICONDUCTOR DEVICE HAVING A MULTI-LEVEL WIRING STRUCTURE**

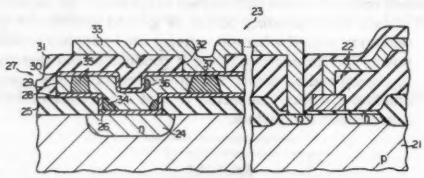
**Takahisa Yamaha, Shizuoka, Japan, assignor to Yamaha Corporation, Shizuoka, Japan**

**Filed Feb. 21, 1990, Ser. No. 482,566**

**Claims priority, application Japan, Feb. 22, 1989, 1-42846**

**Int. Cl.[5] H01L *23/54***

**U.S. Cl. 357—71** **19 Claims**



1. A semiconductor device fabricated on a semiconductor substrate of a first conductivity type and having at least a transistor and a multi level wiring structure, said multi level wiring structure comprising a plurality of conductive paths, and a plurality of insulating layers of silicon oxide, each inserted between two of said conductive paths and having a contact window for providing an inter level conductive path between aforesaid two of the conductive paths, in which at least one of said conductive paths has a metal film formed of a substance selected from the group consisting of aluminum and an aluminum alloy, lower and upper barrier films sandwiching the metal film and formed of a refractory metal silicide, said lower and upper barrier films being directly held in contact with said metal film so as to provide an auxiliary conductive path.

**5,036,383**

**SEMICONDUCTOR DEVICE HAVING AN IMPROVED BONDING PAD**

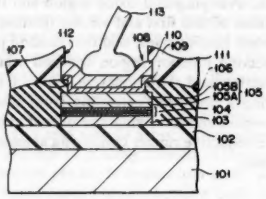
**Seiichi Mori, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Apr. 24, 1990, Ser. No. 513,973**

**Claims priority, application Japan, Apr. 27, 1989, 1-105912**

**Int. Cl.[5] H01L *23/48, 29/04, 29/44***

**U.S. Cl. 357—71** **11 Claims**



1. A semiconductor device comprising:

a semiconductor substrate;

a first insulating layer formed on said semiconductor substrate;

a polysilicon film formed on said first insulating layer;

a second insulating layer formed on said polysilicon film, said second insulating layer including a composite film including oxide and nitride films;

a polysilicon layer formed on said second insulating layer; and

a metal electrode layer formed over said second polysilicon layer, said metal electrode layer being used as a bonding pad for bonding a wire thereon.

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**5,036,384**

**COOLING SYSTEM FOR IC PACKAGE**

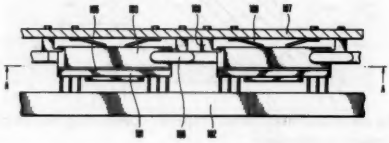
**Kazuhiko Umezawa, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Continuation of Ser. No. 280,354, Dec. 6, 1988, abandoned. This application Apr. 30, 1990, Ser. No. 515,358**

**Claims priority, application Japan, Dec. 7, 1987, 60-310187**

**Int. Cl.[5] H01L *25/04***

**U.S. Cl. 357—82** **2 Claims**



1. A cooling system for an IC package, comprising:

a wiring board on which a plurality of integrated circuits are mounted;

a support plate arranged to oppose said wiring board;

a plurality of pairs of support members, each pair of support members connected between said support plate and a cooling plate, one support member of each pair being connected to opposite sides of the periphery of said cooling plate;

a plurality of heat conduction members connected to respective ones of said plurality of integrated circuits on a side opposite to said wiring board;

a plurality of said cooling plates connected to said support plate by support members and also to respective ones of said plurality of heat conduction members, each of said cooling plates having a coolant channel therein and a coolant inlet and a coolant outlet which are in substantially parallel relation to said wiring board, said plurality

of cooling plates being arranged in a one-to-one correspondence with the plurality of integrated circuits;

flexible coolant pipes, each of said flexible coolant pipes connecting said coolant outlet of one of said cooling plates to said coolant inlet of an adjacent one of said cooling plates, said flexible coolant pipes being in substantially parallel relation to said wiring board; and

a plurality of pairs of elastically deformed leaf springs, each pair being disposed between said pair of support members and having one end connected to said support plate and a second end abutting one side of said cooling plates opposite to a side connected to said heat conduction members to respectively urge said cooling plates against the integrated circuits through said heat conduction members, thereby independently urging said cooling plates against the corresponding integrated circuits so as to independently cool the integrated circuits.

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## 5,036,385

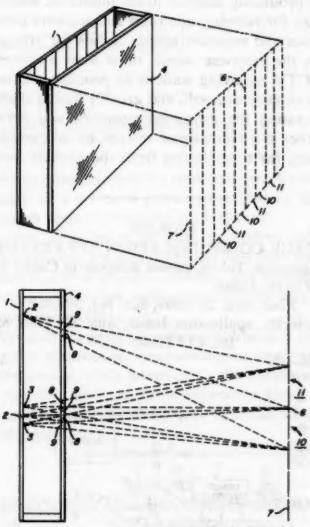
## AUTOSTEREOSCOPIC DISPLAY WITH MULTIPLE SETS OF BLINKING ILLUMINATING LINES AND LIGHT VALVE

**Jesse B. Eichenlaub, Rochester, N.Y., assignor to Dimension Technologies, Inc., Rochester, N.Y.**

**Continuation-in-part of Ser. No. 119,907, Nov. 11, 1987, Pat. No. 4,829,365, which is a continuation-in-part of Ser. No. 837,279, Mar. 7, 1986, Pat. No. 4,717,949. This application Mar. 28, 1989, Ser. No. 329,589**

**Int. Cl.[5] H04N** *15/00, 13/00*

**U.S. Cl. 358—3** **26 Claims**



1. In an electronic display unit for autostereoscopic viewing or two dimensional high, resolution viewing the improvement which comprises

(a) a surface that is capable of emitting light from two or more sets of sites,

(b) means of causing each set to blink on and then off in succession, one set after the other, and to repeat this process continuously, whenever the unit is turned on, and

(c) a light valve in front of and parallel to said surface, said light valve having individual picture elements on its surface, said light valve being capable of displaying a different set of images every time a different set of light emitting sites flash on.

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## 5,036,386

## TELEVISION SIGNAL PROCESSING APPARATUS

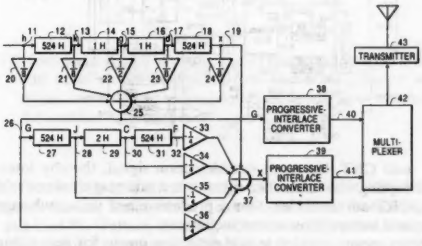
**Yoshio Yasumoto, Nara; Sadashi Kageyama, Hirakata; Syuji Inoue, Neyagawa; Yoshio Abe, Ibaraki, and Hideyo Uwabata, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Jul. 19, 1989, Ser. No. 383,154**

**Claims priority, application Japan, Jul. 22, 1988, 63-184302; Jul. 22, 1988, 63-184303; Jul. 22, 1988, 63-184304**

**Int. Cl.[5] H04N** *7/00, 11/00*

**U.S. Cl. 358—12** **2 Claims**




1. A signal processing apparatus in a television signal transmitting system, comprising:

first group of delay lines for delaying an input signal to obtain a first series of signals in parallel;

first group of coefficient multipliers for weighting said first series of signals;

a first adder for adding outputs of said first group of coefficient multipliers;

second group of delay lines for delaying an output signal from said first adder to obtain a second series of signals in parallel;

second group of coefficient multipliers for weighting said second series of signals;

a second adder for adding outputs of said second group of coefficient multipliers and one of said first series of signals; and

transmitting means for transmitting the output signal from said first adder and an output signal from said second adder.

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## 5,036,387

## COLOR TELEVISION RECEIVER

**Toshimitsu Umezawa, Saitama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Continuation of Ser. No. 16,960, Feb. 20, 1987, abandoned, which is a continuation of Ser. No. 628,984, Jul. 9, 1984, abandoned. This application Feb. 15, 1990, Ser. No. 483,265**

**Claims priority, application Japan, Jul. 11, 1983, 58-124607**

**Int. Cl.[5] H04N** *9/73*

**U.S. Cl. 358—29** **9 Claims**

1. A color television receiver, having a color CRT which uses at least one cathode to display an image corresponding to a video signal, including a luminance signal, comprising:

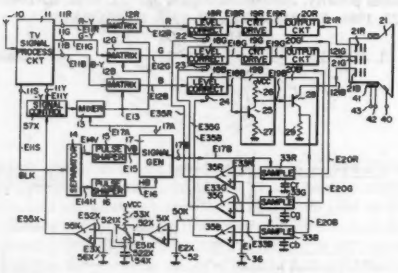
current detector means coupled to said cathode of said CRT, for detecting a magnitude of a cathode current which flows through at least one of said cathodes of said CRT, which corresponds to a then existing cathode temperature of said television, and generating a current signal which is indicative of said magnitude of said cathode current;

sample/hold means coupled to said current detector means for sampling said current signal and for holding the sampled current signal to generate a sampled signal;

level correction means coupled to said sample/hold means and said CRT for adjusting a DC bias of said cathode of said CRT based on said sampled signal, so that a cut-off level of said CRT corresponds to a given reference level which is optimized for whiteness control;

cathode current flow detection mans for generating a detection signal when said magnitude of said cathode current exceeds a given value; and

interruption means coupled to said detection means for interrupting said luminance signal from being supplied to



said CRT, based on said detection signal, thereby interrupting said luminance signal when said magnitude of said CRT current is less than a predetermined value, wherein said interruption means includes:

delay means coupled to said detection means for generating a muting signal for a given period of time after the generation of said detection signal; and

muting means, inserted in a signal path of said video signal for interrupting the supply of said luminance signal to said CRt when said muting signal is generated.

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**5,036,388**

## APPARATUS INCLUDING AN IMPROVED DEVICE FOR RECOVERING THE D.C. COMPONENT

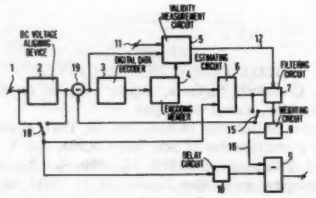
**Philippe Salembier, Paris, and Pascal Hayet, Brunoy, both of France, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Nov. 3, 1989, Ser. No. 431,499**

**Claims priority, application France, Nov. 10, 1988, 88 14685; May 30, 1989, 89 07097**

**Int. Cl.[5] H04N *9/72***

**U.S. Cl. 358—34** **9 Claims**



1. An apparatus for receiving a signal conveying analog luminance and chrominance information components associated with coded digital signal periods, comprising a d.c. component recovery circuit and a decoder circuit for decoding the received digital signal, characterized in that the d.c. component recovery circuit comprises an encoding member for effecting, on the basis of the decoded digital signal, a coding operation of the type used for the creation of the coded digital signal in the received signal, a d.c. component estimating circuit for calculating said estimation from the differences between the coded digital signal received and the coded digital signal recovered by said encoding member, this estimation constituting a d.c. component correction signal, and a subtraction circuit for subtracting said d.c. component correction signal from the received signal throughout the period of one line.

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**5,036,389**

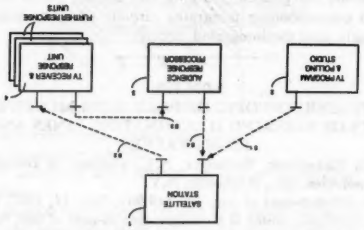
## SATELLITE CONTROLLED AUDIENCE POLLING SYSTEM

**Fernando Morales, Monterrey, Mexico, assignor to Magus, Ltd., Grand Cayman Island and Cayman Corporate Services, Georgetown, both of, Cayman Islands**

**Filed Jul. 14, 1989, Ser. No. 379,921**

**Int. Cl.[5] H04N *7/10*; H04B *17/00***

**U.S. Cl. 358—84** **14 Claims**



1. In a satellite television system for relaying TV programs to a plurality of TV receiving stations from a satellite, the improvement comprising, ground station audience polling means for producing questions in the TV programs for an audience being polled, response means at the TV receiving stations for producing answers to the questions, satellite transceiver means for relaying questions and answers between the polling means and response means, means for processing answers from the response means of at least a subset of said plurality of TV receiving stations to produce a consolidated result from an audience poll, and ground station studio means for incorporating the produced questions and consolidated result together as a video signal relayed by said satellite transceiver means, for transmission from the satellite back to the audience.

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**5,036,390**

## IMAGE COMMUNICATION APPARATUS

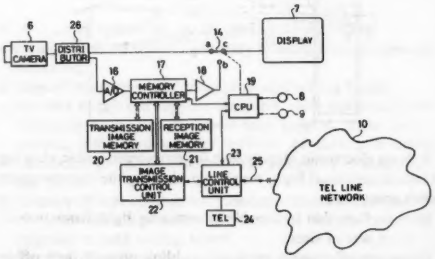
**Makoto Masunaga, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 28, 1989, Ser. No. 398,938**

**Claims priority, application Japan, Aug. 30, 1988, 63-213716**

**Int. Cl.[5] H04N *7/14***

**U.S. Cl. 358—85** **33 Claims**



1. An image transmission apparatus comprising:

generation means for continuously generating a laterally inverted source image signal by photoelectrically converting a source image;

display means for displaying the source image with keeping

a laterally inverted state of the source image, on the basis of the source image signal, said display means being adapted to renew the display according to the source image continuously generated by said generation means; and

transmission means for executing an image transmission by further laterally inverting the laterally inverted source image.

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**5,036,391**

## SYNCHRONIZATION METHOD FOR THE TRANSMISSION, OF AN ASYNCHRONOUS CHANNEL, OR A SERIES OF PICTURES ENCODED BY MEANS OF A VARIABLE LENGTH CODE, AND DEVICE FOR THE IMPLEMENTATION OF THIS METHOD

**Eric Auvray, Orvault, and Claude Perron, Rennes, both of France, assignors to Thomson Consumer Electronics, Courbevoie, France**

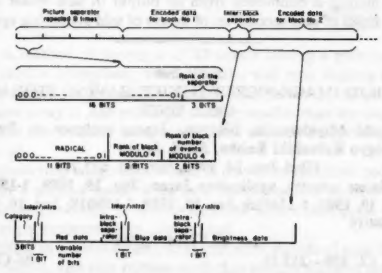
**PCT No. PCT/FR88/00650, § 371 Date Aug. 25, 1989, § 102(e) Date Aug. 25, 1989, PCT Pub. No. WO89/06471, PCT Pub. Date Jul. 13, 1989**

**PCT Filed Dec. 30, 1988, Ser. No. 408,510**

**Claims priority, application France, Dec. 30, 1987, 87 18372**

**Int. Cl.[5] H04N *7/12***

**U.S. Cl. 358—133** **6 Claims**




1. Synchronization method for transmission, on an asynchronous channel, of a series of pictures encoded by means of a variable length code, comprising the steps of:

transmitting, in addition to data, separators called inter-block separators for separating the data corresponding to separate blocks of picture elements, and separators called picture separators for separating the data corresponding to successive pictures; and

transmitting first synchronization patterns at a picture line frequency and second synchronization patterns at a picture frequency, while interrupting the transmission of the data and the separators; the separators being such that they cannot be imitated by licit concatenations of data and/or separators.

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**5,036,392**

## DATV ENCODING AND DECODING METHOD AND APPARATUS

**Johannes J. M. Janssen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Jan. 29, 1990, Ser. No. 473,252**

**Claims priority, application United Kingdom, Feb. 3, 1989, 8902404**

**Int. Cl.[5] H04N *7/12***

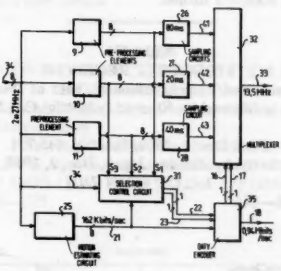
**U.S. Cl. 358—138** **16 Claims**

1. A method of encoding a television signal having a plurality of frames, comprising the steps of:

(a) selectively subjecting two successive frames of said television signal to at least one selected operation taken from a plurality of operations;

(b) assigning a first code word to a first selected operation providing a first spatial resolution;

(c) assigning a second code word to a second selected operation providing a first temporal resolution; and




(d) forming a digital assisting signal from said first and second code words wherein a first Hamming-distance between said first and second code words is at least one-half the number of bits of each code word.

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**5,036,393**

## MOTION DEPENDENT VIDEO SIGNAL PROCESSING

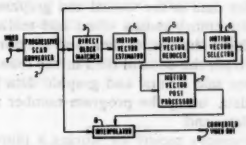
**Raphael Samad, Basingstoke; John W. Richards, Stockbridge, and Carl W. Walters, Reading, all of United Kingdom, assignors to Sony Corporation, Tokyo, Japan**

**Filed Apr. 20, 1990, Ser. No. 511,740**

**Claims priority, application United Kingdom, Apr. 27, 1989, 8909653**

**Int. Cl.[5] H04N *7/01***

**U.S. Cl. 358—140** **10 Claims**




1. A motion compensated video standards converter for converting an input video signal containing a plurality of pixels and having a first standard format to a motion compensated video signal having a second standard format, said converter comprising:

receiving means for receiving said input video signal having said first standard format;

comparator means coupled to said receiving means for comparing blocks in a first field or frame of the received video signal with a plurality of blocks in the following field or frame of said received video signal, said comparator means deriving motion vectors which represent the motion of the content of the respective blocks compared between said first field or frame and said following field or frame;

allocating means for allocating a respective motion vector to each pixel included in each field of frame of said received video signal;

checking means for checking the allocated motion vectors so as to identify spurious motion vectors by comparing the allocated motion vector for each pixel with motion vectors allocated to respective adjacent pixels;

replacing means for replacing each identified spurious mo-

tion vector with a non-spurious motion vector allocated t one of the respective adjacent pixels; and

interpolator means for interpolating said received video signal in dependence on said allocated motion vectors to produce said motion compensated video signal having said second standard format.

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5,036,394

## VIDEOTEXT RECEIVER

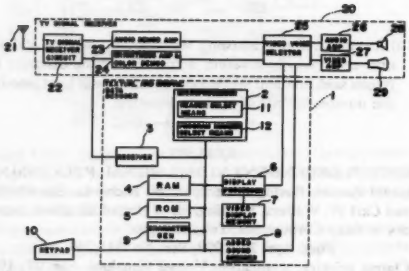
Takashi Morii, and Youichi Ishibashi, both of Ibaraki, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 4, 1989, Ser. No. 445,771

Claims priority, application Japan, Dec. 2, 1988, 63-306466

Int. Cl.[5] H04N *7/08*

U.S. Cl. 358—146 5 Claims



1. A video text receiver for receiving textual and graphic data including control data, header data and main text data, comprising:

a first memory means for storing the textual and graphic data of a plurality of programs in a received broadcast signal;

a control means having a header select means for selecting the header data in the textual and graphic data stored in said first memory means when said textual and graphic data includes the header data, and selecting the program number from the control data in the textual and graphic data when said textual and graphic data fails to include header data, using the program number in place of the header data; and

a second memory means for storing a plurality of the selected header data.

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5,036,395

## VIDEO PRODUCTION FACILITY

Ulrich Reimers, Pinneberg, Fed. Rep. of Germany, assignor to BTS Broadcast Television Systems GmbH, Darmstadt, Fed. Rep. of Germany

Filed Nov. 3, 1989, Ser. No. 431,601

Claims priority, application Fed. Rep. of Germany, Nov. 9, 1988, 3838000

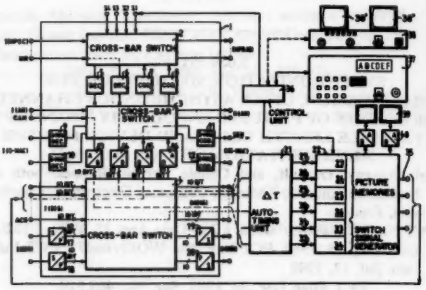
Int. Cl.[5] H04N *5/222*

U.S. Cl. 358—185 9 Claims

1. A video apparatus production facility comprising a switching system having video signal inputs, video signal outputs and switching control inputs, a mixer for video signals having video signal inputs, video signal outputs and at least one control input, inputs of a first set of said video signal inputs of said switching system being respectively connectable to sources of video signals and outputs of a first set of said video signal outputs of said switching system being connectable to respective equipments for displaying, transmitting, storing or otherwise utilizing video production signals, and wherein:

outputs of a second set of said of video signal outputs of said switching system (1) are connected to respective video signal inputs of said mixer (22) and inputs of a second set of said video signal inputs of said switching system (1) are connected to respective outputs of a first set of video signal outputs of said mixer (22), and.

a control unit (36) is provided for supply of mixer control signals to said at least one control input of said mixer (22) and of switching control signals to said control inputs of



said switching system in such a manner that inputs for video signals which are to be mixed are connected to outputs of said second set of video signal outputs of said switching system and every video signal resulting from mixing is connected from an output of said mixer to an input of said second set of inputs of said switching system.

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5,036,396

## SOLID IMAGE-PICKUP DEVICE HAVING STORAGE CELL UNIT

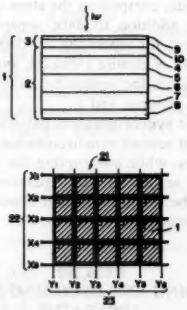
Takeshi Miyabayashi, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Jun. 14, 1990, Ser. No. 537,797

Claims priority, application Japan, Jun. 19, 1989, 1-158014; Jun. 19, 1989, 1-158015; Jun. 19, 1989, 1-158018; Jun. 19, 1989, 1-158019

Int. Cl.[5] H04N *3/14*

U.S. Cl. 358—213.11 16 Claims



1. A solid image-pickup device for converting an optical image of an object into a corresponding electric charge image and reproducing the image on the basis of the corresponding electrical charge image, comprising:

imaging means having a number of photoelectric conversion units each having a light receiving surface for converting an optical image of an object incident thereto into an electrical signal representing a light amount of the incident optical image, and a number of storage cell units each comprising a positive electrode, a solid electrolyte and a negative electrode and each storing charges in accordance with the electrical signal, wherein each of said photoelec-

tric conversion units is laminated on one of said positive and negative electrodes, to thereby form and store therein an electric charge image corresponding to the optical image, said photoelectric conversion units and said storage cell units being arranged in a matrix form and each of said photoelectric conversion units being laminate on each of said storage cell units; and

charge image detecting means for optically or electrically reading out the electrical charge signal stored in said solid image-pickup device to reproduce the optical image.

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**5,036,397**

## METHOD OF DRIVING A CCD SENSOR BY CHANGING THE TRANSFER PULSE PERIOD RELATIVE TO THE SHIFT PULSE PERIOD

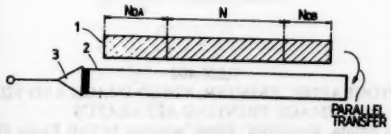
**Yoshihuki Nagabusa, Tokyo, Japan, assignor to Asahi Kogaku Kogyo K.K., Tokyo, Japan**

**Filed Jun. 8, 1989, Ser. No. 363,012**

**Claims priority, application Japan, Jun. 10, 1988, 63-143329**

**Int. Cl.[5] H04N *3/24***

**U.S. Cl. 358—213.26** **13 Claims**




1. A method of driving a CCD sensor having a photosensitive section comprising front, middle, and rear regions each containing a photosensitive picture element array, the picture element array in said rear region being smaller than the picture element array in said front region, said method comprising the steps of:

transferring image data stored in said photosensitive section in a parallel mode from said photosensitive section to a transfer section in synchronization with a shift pulse having a predetermined period; and

shifting in a serial mode picture element signals of said front, middle, and rear regions such that picture element signals of said front and middle regions but not of said rear region are read out from said transfer section in synchronization with a transfer pulse having a predetermined period before the following transfer of the image data from said photosensitive section to said transfer section in the parallel mode.

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**5,036,398**

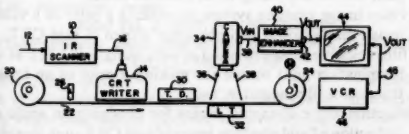
## FILM WRITER AND VIEWER SYSTEM

**William E. Westell, Weston, Mass., assignor to Honeywell Regelsysteme GmbH, Fed. Rep. of Germany**

**Filed Oct. 3, 1989, Ser. No. 416,369**

**Int. Cl.[5] H04N *5/253, 5/36***

**U.S. Cl. 358—214** **29 Claims**




1. A film writer and viewer system comprising:

energy producing means to expose energy sensitive film to a first predetermined density;

writer means to expose said film to a second maximum predetermined density with information to be viewed;

developer means to develop said film;

transducer means mounted to receive energy indicative of the information from the film and to produce an output representative thereof; and

enhancing means connected to the transducer means to receive said output and to increase the contrast of the information so as to produce an enhanced output with greater contrast of the information recorded on said film by said writer means.

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**5,036,399**

## PHASE CONTROLLED CAMERA SYSTEM HAVING DETACHABLE LENS

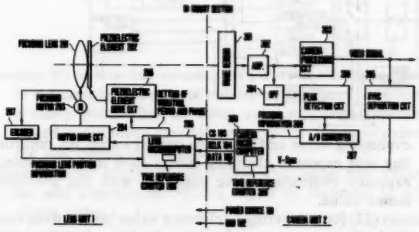
**Toshiaki Mabuchi, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 28, 1989, Ser. No. 399,166**

**Claims priority, application Japan, Aug. 31, 1988, 63-216933**

**Int. Cl.[5] G02B *13/16;* H04N *5/225, 5/30;* G03B *17/00***

**U.S. Cl. 358—225** **42 Claims**



1. A camera system having a lens unit and a camera unit to which said lens unit can be detachably attached, said camera system comprising:

(A) control means for controlling an operation of said lens unit and an operation of said camera unit to control said lens unit, so as to synchronize a phase of the operation of said lens unit with a phase of the operation of said camera unit; and

(B) communication means for effecting communication between said camera unit and said lens unit by using a reference signal for obtaining phase synchronization between the operation of said lens unit and the operation of said camera unit.

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**5,036,400**

## AUTOMATIC IRIS CORRECTION APPARATUS FOR USE IN AUTOMATICALLY ADJUSTING EXPOSURE IN RESPONSE TO A VIDEO SIGNAL

**Toshinobu Haruki, Shijonawate, Japan, assignor to Sanyo Electric Co., Ltd., Japan**

**Division of Ser. No. 294,866, Jan. 9, 1989. This application Aug. 3, 1990, Ser. No. 562,654**

**Claims priority, application Japan, Jan. 12, 1988, 63-4344; Feb. 15, 1988, 63-43711**

**Int. Cl.[5] H04N *5/238;* G03B *7/08***

**U.S. Cl. 358—228** **8 Claims**

1. An auto iris apparatus responsive to a video signal obtained from image sensing means (1, 3, 4) for automatically adjusting exposure to an object, comprising:

means (2, 5, 19) for changing exposure to said object,

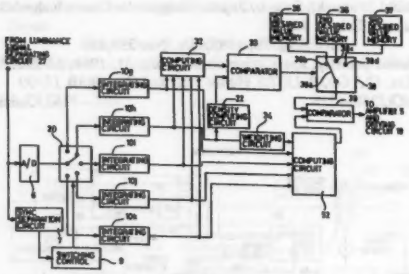
means (7, 9, 20), responsive to said video signal, for providing in a time-divisional manner a plurality of sampling areas of an entire sensed image in said video signal,

exposure evaluating value detecting means (6, 10*g*, 10*h*, 10*i*, 10*j*, 10*k*), responsive to said plurality of sampling areas, for detecting a level of a luminance signal in the video signal in each of said plurality of sampling areas and for supplying the level as a first exposure evaluating value in for the corresponding sampling area so as to form a plurality of first exposure evaluating values,

computing means (34, 52) for weighting with a predeter-

mined first weight one of the first exposure evaluating values corresponding to a particular one of the sampling areas, weighting with a second weight smaller than said first weight each of the first exposure evaluating values corresponding to the sampling areas other than said particular one sampling area, and computing a second exposure evaluating value representing said entire sensed image based on the plurality of weighted first exposure evaluating values,

means (39), operative in response to the second exposure



evaluating value and a predetermined value, for controlling said exposure changing means such that the second exposure evaluating value coincides with the predetermined value,

means (32) for computing a reference value based on the sum of the first exposure evaluating values supplied from the exposure evaluating value detecting means, and

means (33, 35, 36, 37, 38) for changing said predetermined value according to a relation between the one first exposure evaluating value corresponding to said particular sampling area and said reference value.

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5,036,401

## DEVICE FOR DISPLAY OF INFORMATION WITH COMPLETE SCANNING BEAM ARREST

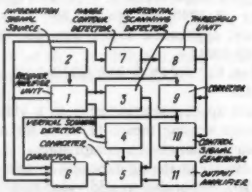
**Alexandr A. Antonov, prospekt Vernadskogo 85, kv. 64; Vyacheslav V. Petrov, ulitsa Montazhnikov, 104, and Olga I. Antonova, prospekt Vernadskogo, 85, kv. 64, all of Kiev, U.S.S.R.**

**PCT No. PCT/SU88/00079, § 371 Date Jan. 18, 1990, § 102(e) Date Jan. 18, 1990, PCT Pub. No. WO89/10038, PCT Pub. Date Oct. 19, 1989**

**PCT Filed Apr. 14, 1988, Ser. No. 457,824**

**Int. Cl.[5] H04N *5/68***

**U.S. Cl. 358--242** **8 Claims**



1. A device for displaying information, comprising: a receiver unit having a line sync output, a frame sync output, at least one information output, and an input connected to a source of an information signal, and to receive, amplify and separate an information video signal, as well as line and frame synchronizing signals; horizontal and vertical scanning generators to produce a standard pattern and having their inputs connected, respectively, to the line and frame sync outputs of the receiver-amplifier unit; an information video signal-to-image converter, which is to produce an image and has a first input connected to an output of the horizontal scanning generator, a second input connected to an output of the vertical scanning generator, and a third input electrically connected with the information output of the receiver-amplifier unit; an output amplifier having an output connected to a fourth input of the signal-to-image converter; a detector of contours of the displayed image, which is to produce a signal to control horizontal scanning during display of the image contours and has an input connected to the information output of the receiver-amplifier unit; a threshold unit connected to an output of the image contour detector and to obtain, when displaying image contours, an insignificant horizontal scanning speed, a control signal generator which produces sawtooth voltage when displaying image contours and has an input connected to the output of the threshold unit and an output connected to the input of the output amplifier to convert the sawtooth voltage into sawtooth current producing a deflection field having the same strength as the field produced by the horizontal scanning generator but of opposite polarity.

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5,036,402

## PHOTOGRAPHIC PRINTER, VIDEO IMAGE AND FILM IMAGE PRINTING APPARATUS

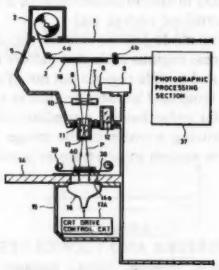
**Kazuo Shiota, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Continuation of Ser. No. 207,825, Jun. 17, 1988, abandoned. This application Mar. 28, 1990, Ser. No. 501,349**

**Claims priority, application Japan, Jun. 19, 1987, 62-152982; Jun. 29, 1987, 62-99926[U]**

**Int. Cl.[5] H04N *5/84, 5/59;* G11B *7/24***

**U.S. Cl. 358—244** **13 Claims**



1. A photographic printer for making prints according to alternative video image printing and film negative image printing systems, said printer comprising:

a CRT for outputting an illuminated raster area on a phosphor screen according to an electron beam;

a video image printing system for making a print of a video image displayed on said phosphor screen of said CRT;

a film negative image printing system using said CRT as an illumination light source for making a print of an image frame of a film negative; and

deflection angle changing means for changing an angle of deflection of said electron beam of said CRT such that, for said film negative image printing system, a raster area on said phosphor screen is varied to a size smaller and a raster density greater than a size and density of a raster area for said video image printing system, said raster area for said film negative image printing system corresponding to the size of said single image frame of said film negative for making said print of said image frame of said film negative.

5,036,403

## MODE OF OPERATING OF A CIRCUIT ARRANGEMENT FOR IMPROVING THE BOUNCE BEHAVIOR OF PRINT FORM ENGRAVING SYSTEMS

Rolf Hupka, Flintbek, and Christian Wiechering, Kiel, both of Fed. Rep. of Germany, assignors to Dr. Ing. Rudolf Hell GmbH, Fed. Rep. of Germany

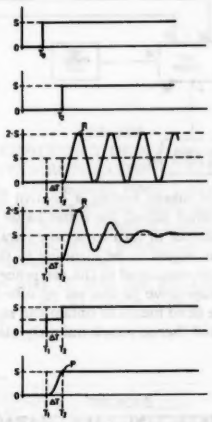
PCT No. PCT/DE88/00449, § 371 Date Jan. 22, 1990, § 102(e) Date Jan. 22, 1990, PCT Pub. No. WO89/00502, PCT Pub. Date Jan. 26, 1989

PCT Filed Jul. 20, 1988, Ser. No. 458,758

Claims priority, application Fed. Rep. of Germany, Jul. 22, 1987, 3724256

Int. Cl.[5] H04N *1/21, 1/23, 1/032*

U.S. Cl. 358—299 3 Claims



1. A method of operating a circuit arrangement for improving a bounce behavior of an engraving system electromagnetically driven by an electrical drive signal for engraving printing forms, comprising the steps of intermediately storing a original electrical drive signal in a storage unit, producing a correction signal from said stored original electrical drive signal during a storage time of said signal in said storage unit, supplying said correction signal to said engraving system and supplying said stored original electrical drive signal to said engraving system after the end of the storage time, whereby said correction signal chronologically precedes the original electrical drive signal when supplied to said engraving system.

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5,036,404

## VIDEO DISC PLAYER COMPRISING CLAMPING CIRCUIT FOR MUSE SIGNAL

Hiroshi Watanabe, Gifu; Toshiaki Hioki, Ogaki, and Yoshiko Morita, Gifu, all of Japan, assignors to Sanyo Electric Co., Ltd., Moriguchi, Japan

Filed Jul. 3, 1989, Ser. No. 375,306

Claims priority, application Japan, Jul. 5, 1988, 63-167411

Int. Cl.[5] H04N *5/91*

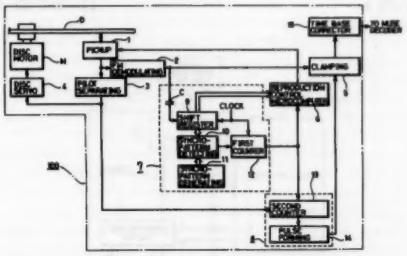
U.S. Cl. 358—337 4 Claims

1. A video disc player for optically reproducing high definition video information recorded on a recording medium (D), an FM video signal obtained by frequency-modulating a MUSE signal obtained by bandwidth compression of a high-definition video signal using a TCI (Time Compressed Integration)multiple sub-nyquist sampling encoding system after multiplexing a clamp level signal and a Manchester-coded index signal on particular lines of the MUSE signal, and a pilot signal of a constant frequency being frequency-multiplexed, to be recorded on said recording medium, said video disc player comprising:

means (2) for reproducing said MUSE signal from said recording medium,

means (3) for reproducing said pilot signal from said recording medium,

means (7) for detecting said index signal from said reproduced MUSE signal,



means (8) for starting counting of pulses of said pilot signal in response to detection of said index signal and generating a clamp pulse when its count value reaches a predetermined count value corresponding to the timing of detecting said clamp level signal, and

means (5) for clamping said clamp level signal multiplexed on said reproduced MUSE signal in response to said clamp pulse.

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5,036,405

## IMAGE AMENDING METHOD

Toshihiro Kojima, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 120,103, Nov. 13, 1987, abandoned. This application Sep. 25, 1989, Ser. No. 411,251

Claims priority, application Japan, Nov. 19, 1986, 61-276216; Nov. 19, 1986, 61-276217

Int. Cl.[5] H04N *5/21*

U.S. Cl. 358—448 11 Claims

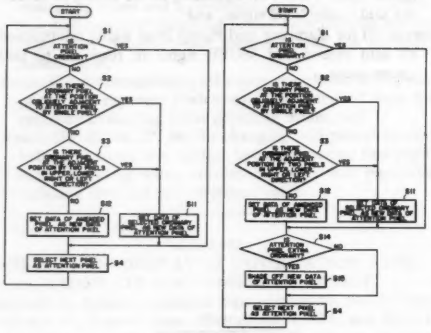
1. An image amending method comprising the steps of:

classifying pixels which are represented by digital image data into extraordinary pixels which need to be amended and ordinary pixels which do not need to be amended;

setting an attention pixel; and

when the attention pixel is an extraordinary pixel, amending the attention pixel by setting the digital image data corre-

sponding to a peripheral ordinary pixel, other than pixels at positions adjacent to the attention pixel in the upper,



lower, right, and left directions, as amendment data corresponding to the attention pixel.

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**5,036,406**

## METHOD AND APPARATUS FOR OBTAINING IDENTICAL OUTPUT SIGNAL FROM NOMINALLY IDENTICAL TIME BASE CORRECTOR UNIT HAVING SLIGHTLY DIFFERENT CHARACTERISTICS

**Glenn Sanders, 17-12 Bellaire Ave., Fairlawn, N.J. 07410**

**Filed Feb. 21, 1990, Ser. No. 482,631**
**Int. Cl.[5] G11B *5/02*; H04N *5/78, 17/02***
**U.S. Cl. 360—25** **8 Claims**

7. Apparatus for use with a plurality of time base corrector units, each time base corrector unit being capable of playing a video tape to produce a corresponding video output signal containing four viewing parameters namely video gain, chroma gain, set up and hue, the viewing parameters having values which can be varied, the units having slightly different electrical characteristics so that when each of these units is caused to play the same tape at identical parameter values, the video output signals will differ from unit to unit, said apparatus comprising

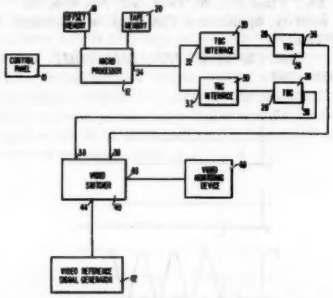
a video switcher having a first input to which each unit output signal can be supplied in turn and a second input to which a standard reference signal containing the same parameters but at different values can be supplied, the switcher having an output at which both the unit output signal and the reference signal appear as a mixed video signal;

first means to supply an output signal from one of the units playing a standard reference tape to said first input;

second means to supply said reference signal to said second input;

a display device having an input coupled to the output of the switcher and responsive to the mixed signal to display same as a composite;

third means for producing an offset signal variable in value and for supplying said offset signal to the input of the said



unit, said third means having a control for varying the value of the offset signal, the offset value being adjusted for each parameter in turn to set the parameter value of the unit output signal to be identical to the value of the same parameter contained in the reference signal; and

fourth means responsive to the set of offset signal values yielded by the third means to obtain and store data monotonically related thereo which uniquely identifies the said unit.

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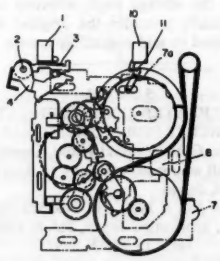
**5,036,407**

## DEVICE FOR DETECTING TAPE CHARACTERISTICS AND HEAD POSITION

**Susumu Yoshida; Sei Onishi, and Kenji Uchiyama, all of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan**

**Filed May 15, 1989, Ser. No. 351,250**
**Claims priority, application Japan, Jul. 28, 1988, 63-99080**
**Int. Cl.[5] G11B *5/02, 5/54***
**U.S. Cl. 360—25** **8 Claims**



1. A device for detecting whether a tape is a normal tape or a chrome or metallic tape and for detecting whether a recording/reproducing head is at an eject position, a stop portion or a rewind or fastforward position, said device being for a cassette tape player, the cassette tape player including a chassis and said recording/reproducing head mounted on a movable head bed, said device comprising:

a first switch that turns on when said head is in a recording or reproducing position;

an operating piece movable in accordance with the movement of said head;

a switching piece for turning on and off said first switch, said switching piece having a cam surface engageable with said operating piece;

a detecting piece having a cam surface engageable with said operating piece and having a detecting portion insertable into a tape characteristic hole formed in a cassette half, said hole being indicative of whether said tape is a normal tape or a chrome or metallic tape; and

a second switch mounted on said chassis in spaced apart relation to said first switch and positioned so as to be turned on and off by said movable head bed in accordance with the movement of said head.

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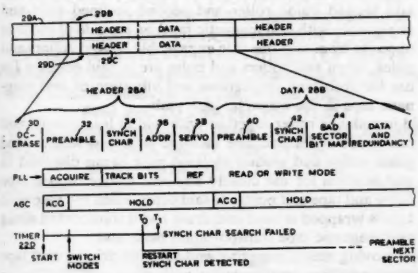
## 5,036,408
## HIGH EFFICIENCY DISK FORMAT AND SYNCHRONIZATION SYSTEM

**Michael D. Leis, Framingham; Bruce Leshay, Marlborough; Michael Muchnik, Framingham; Satish Rege, Groton, all of Mass.; Charles M. Riggle, Colorado Springs, Colo., and Lih-Jyh Weng, Lexington, Mass., assignors to Digital Equipment Corporation, Maynard, Mass.**

**Filed May 12, 1988, Ser. No. 193,090**
**Int. Cl.[5] G11B** *5/09*
**U.S. Cl. 360—48** **31 Claims**




1. A magnetic disk for recording signals representing binary data for storage and retrieval of information in conjunction with a read write head, said disk comprising:

A. a plurality of concentric tracks, each of said tracks comprising a plurality of sectors,

B. each of said sectors comprising a header section and a data section, said header section having a leading end and a trailing end, said data section having a leading end and a trailing end, said trailing end of said header section being adjacent to said leading end of said data section,

C. said header section having a plurality of magnetically recorded fields including:

1) a DC-erase field disposed adjacent to said leading end of said header section and comprising a transitionless signal segment,

2) a preamble field having recorded therein a series of signals suitable for synchronization of a clock to bits recorded in said header section,

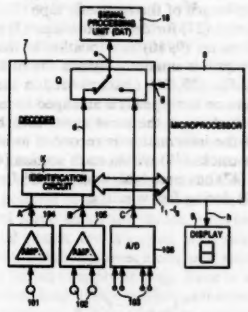
3) a synchronization field containing a synchronization character for synchronizing reading operations with group and byte boundaries, and

4) an address field containing the address of said sector.

## 5,036,409
## SIGNAL SELECTION ARRANGEMENT

**Jürgen Kaaden, VS-Villingen, and Dietmar Uhde, Königsfeld, both of Fed. Rep. of Germany, assignors to Deutsche Thomson-Brandt GmbH, Villingen-Schwenningen, Fed. Rep. of Germany**

**Filed Mar. 15, 1989, Ser. No. 323,723**
**Int. Cl.[5] G11B** *5/09, 15/12*
**U.S. Cl. 360—51** **4 Claims**




1. A signal recorder or reproducer apparatus, comprising:

a plurality of input terminals, each receiving a corresponding input signal from a corresponding signal source;

a frequency detector comprising a phase-lock loop circuit coupled to said input terminals for producing a detector output signal in accordance with an output signal of said phase-lock-loop circuit such that the presence of said detector output signal indicates that a frequency of a given input signal of the input signals is within a predetermined range of frequencies, said detector including means for detecting that said phase-lock-loop circuit is in a non phase-locked condition:

means for establishing a priority among the input signals received at said input terminals, said priority being determined by a priority schedule in accordance with a selection procedure;

means coupled to said input terminals and to said priority establishing means and responsive to said detector output signal for selecting from said input terminals that input terminal which receives said input signal having both said frequency that is within said predetermined range of frequencies as determined by said detector output signal and said priority as determined by said priority obtained from said priority schedule in accordance with said selection procedure; and

signal recording or reproducing means coupled to the selected input terminal for recording or reproducing the input signal that is received at said selected input terminal.

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## 5,036,410
## SYSTEM FOR RANDOM ACCESS TO INFORMATION ON A MAGNETIC TAPE

**Martinus A. Renders, and Budiman Sastra, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Oct. 5, 1989, Ser. No. 418,418**
**Claims priority, application Netherlands, Oct. 6, 1988, 8802449**
**Int. Cl.[5] G11B** *15/18*
**U.S. Cl. 360—72.2** **6 Claims**

1. A system comprising a magnetic tape (7) wound on two reels (5, 6) and a magnetic-tape apparatus (1), the magnetic-tape apparatus (1) comprising:

reel-drive means (3, 4) for rotating the two reels (5, 6) on which the magnetic tape (7) is wound for the purpose of

tape transport from one reel to the other, a length of said magnetic tape (7) extending between the two reels,

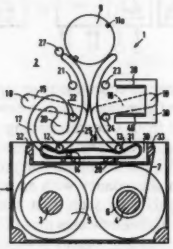
magnetic-head means (9, 10) comprising at least one magnetic head (11) for recording and/or reproducing information on/from the magnetic tape (7),

buffer means which in an operational position of the magnetic tape (7), in which position the tape is in contact with the magnetic-head means (9, 10), form a first and a second tape buffer (34, 35) which in relation to the tape transport are situated upstream and downstream of the magnetic-head means (9, 10) and which are capable of buffering parts of the length of the magnetic tape (7),

tape-drive means (27) for driving the tape (7) past the magnetic-head means (9, 10) at a location in that part of the tape path which is situated between the first and the second tape buffer (35, 34), characterized in that

the information on the tape (7) is arranged in sections (47) of a length which is at the most equal to a buffered tape length and the information is recorded in individual discontinuous tracks (48) within each section (47),

each section (47) has a readable address (49) for locating the section (47) during fast winding,



the system comprises read means for reading the address (49),

the system comprises input means (51) for selecting one of the sections,

the system comprises a control unit (45), comprising:

a selection device (45*a*) which receives signals (c) from an input means and signals (a) from a read means and which controls the tape transport for rapidly locating the selected address,

control means (45*b*) for the tape drive (27) to move the magnetic tape (7) rapidly in either direction within a section (47) to bring the individual discontinuous tracks (48) rapidly opposite the magnetic-head means (9) so that the system is suitable for the storage of large amounts of information in serial form but the information in every section (47) can nevertheless be scanned directly with a large mechanical bandwidth, which is dictated mainly by the dynamic characteristics of the buffer means and the drive means (27), and isolated form the reed-drive means (3, 4) and the reels (5, 6).

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**5,036,411**

## MAGNETIC TAPE TRANSPORT MECHANISM WHICH ABSORBS MAGNETIC TAPE OSCILLATIONS AND VIBRATIONS IN THE VICINITY OF A ROTATIONAL DRUM

**Atsushi Hosoya, Sagamihara, and Eiichi Tsuchiya, Yokohama, both of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan**

**Filed Apr. 25, 1989, Ser. No. 342,777**

**Claims priority, application Japan, Apr. 26, 1988, 63-56094[U]**

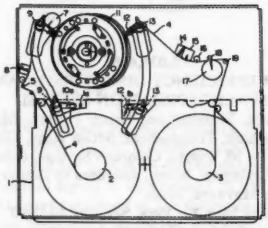
**Int. Cl.[5] G11B *5/027***

**U.S. Cl. 360—85** **9 Claims**

1. A magnetic tape transport mechanism comprising:

a rotary drum having a cylindrical surface portion and a plurality of magnetic heads and spaced-apart tape entry and tape exit points;

tape path forming means including one movable guide roller and one movable inclined pole engageable with one side of the tape and disposed on one side of said drum and a second movable guide roller and second movable inclined pole engageable with said one side of the tape and disposed on the other side of said drum, said rollers and poles being movable to withdraw the tape out of a cassette and wrap the tape partially around said surface of said drum in position for use where said one roller and pole are at said tape entry point of said drum and said second guide roller and second inclined pole are at said tape exit point of said drum, from which points said magnetic tape begins to contact with and to leave from said drum, respectively, thereby causing said magnetic tape to partially wrap around the cylindrical surface portion of said drum through a predetermined angular range and to form a magnetic tape transportation path near said drum;



an impedance roller disposed at a fixed position relative to said drum between the guide roller and inclined pole of at least one of said one guide roller and one inclined pole and said second guide roller and second inclined pole and engageable with said magnetic tape, on the side of the tape opposite from said one side engageable by said rollers and poles, when said rollers and poles are in said position for use for absorbing oscillations and vibration of said magnetic tape in the magnetic tape path;

said impedance roller together with said at least one of said one guide roller and one inclined pole and said second guide roller and second inclined pole being disposed in said position for use closely adjacent to one of said tape entry and tape exit points of said drum when the magnetic tape is wrapped around said drum and is transported along said magnetic tape transportation path; and

tape moving means engaging said tape for driving said tape along said tape transportation path.

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**5,036,412**

## MAGNETIC RECORDING AND REPRODUCING APPARATUS WITH SINGLE INCLINING POST

**Kenichi Shiraishi, Noda; Takamasa Uejima, Abiko, and Hironobu Katayama, Noda, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Feb. 10, 1989, Ser. No. 308,820**

**Claims priority, application Japan, Feb. 12, 1988, 63-18043[U]**

**Int. Cl.[5] G11B *15/61***

**U.S. Cl. 360—85** **6 Claims**

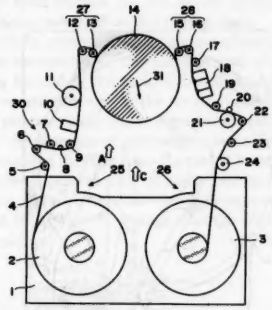
1. A magnetic recording and reproducing apparatus for reading and writing information from and to a magnetic tape with at least one traveling reference face and stored in a cassette, said cassette having first and second tape storing portions, the apparatus comprising:

rotary head cylinder means for reading and recording information from and to said magnetic tape;

first and second loading means positioned adjacent to said first and second storing portions of said cassette for extracting said magnetic tape from said cassette and positioning said tape in contact with said rotary head cylinder

means thereby said tape forms an "M" shape among said cassette, rotary head cylinder means and said first and second loading means; and

a single inclining means positioned near the first storing position of said cassette for inclining the reference face of



said magnetic tape onto said rotary head cylinder means thereby reducing the winding angle of the tape and correspondingly the traveling load on the tape, said single inclining means being fixedly disposed at the magnetic face side of the magnetic tape, and spaced from said first and second loading means.

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**5,036,413**

**CASSETTE LOADING APPARATUS HAVING A SUPPLEMENTAL FORCE IMPARTING UNIT TO SUPPLY AN ASSIST FORCE TO SUPPLEMENT THE PRIMARY CASSETTE DRIVE FORCE DURING EJECTION TO URGE THE CASSETTE FROM A RECORD/REPRODUCE POSITION TO AN INTERMEDIATE POSITION DIRECTLY ABOVE**

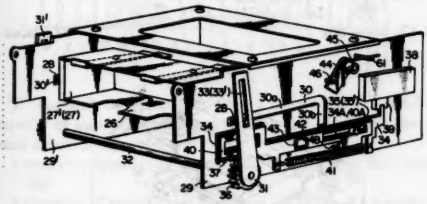
**Yoshinobu Kishimoto, Takarazuka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Jun. 27, 1989, Ser. No. 371,832**

**Claims priority, application Japan, Jul. 1, 1988, 63-165424; Jul. 1, 1988, 63-165425; Jan. 27, 1989, 1-17958**

**Int. Cl.[5] G11B *15/675, 17/04, 5/008***

**U.S. Cl. 360—96.5** **9 Claims**



1. A cassette loading apparatus, comprising:

a power source for producing a drive power:

a cassette holder having opposite side walls each having a projection provided thereon, said cassette holder for releasably holding a tape cassette between said side walls;

side plates disposed respectively along said side walls and each including a guide means which is engaged with said projection to guide said cassette holder between a first position where the tape cassette is loaded and unloaded, and a second position where said tape cassette is subjected to reproduction or recording, each of said guide means having a first portion along which the cassette holder is moved in a substantially horizontal direction to an intermediate position substantially directly above said second position and a second portion extending in a substantially vertical direction from said intermediate position to said second position;

drive means for driving said cassette holder to move along said guide means between said first position and said second position;

clutch means including a power output member engaged with said drive means and disposed along one of said side plates to transmit said drive power to said drive means along said side plate, and a power input member disposed along said power output member, said power input member being selectively engaged with said power output member by a resilient means and receiving said drive power transmitted from said power source;

said resilient means engaging said power input member with said power output member such that said power input member is associated with said power output member to transmit said drive power to said power output member, said resilient means storing a resilient force tending to urge said cassette to move from said second position to said first position when said cassette holder is moved from said first position to said second position; and

supplemental force imparting means, provided on at least one of said plates, for engaging with said drive means when said projection moves along said second portion of said guide means to apply an assist force to said projection in a direction along which said projection moves from said second position to said intermediate position.

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**5,036,414**

**MAGNETIC TAPE CASSETTE APPARATUS HAVING LOADING/UNLOADING MECHANISM WITH SPRING-BIASED COMPONENTS**

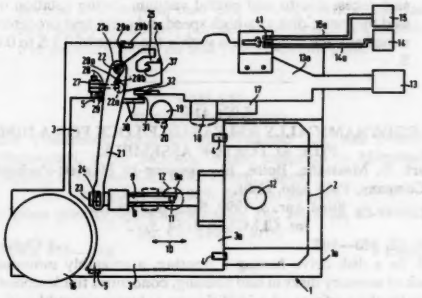
**Norbert Kunze, Ehringshausen, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Jul. 14, 1989, Ser. No. 380,183**

**Claims priority, application Fed. Rep. of Germany, Jul. 28, 1988, 3825589**

**Int. Cl.[5] G11B *17/04***

**U.S. Cl. 360—96.5** **4 Claims**



1. A magnetic tape cassette apparatus (1) having a drive mechanism which is used for playing magnetic tape cassettes, can be operated via actuating rods (13*a* to 15*a*) and has a loading mechanism which, by means of an operating rod (13*a*), a lift lever (3) and an operating lever (21), can draw a magnetic tape cassette (2) into a playing position and raise and push it out into a removal position, a catch (26) of the operating rod (13*a*), which catch travels down a pivotal guide (25) of the operating lever (21), pivoting the operating lever (21), with the cooperation of a pushing-out spring (27*a*), into the removal position when the guide (25) releases this pivoting movement, and the lift lever (3) travelling by a tracking pin (31) along a lift guide (32) of the operating rod (13*a*) in order, during the displacement of the operating rod (13*a*), to lower or raise the lift lever (3) according to the lift guide (32), characterized in that

the pushing-out spring (27*a*) biases said operating lever (21)

toward a position corresponding to said removal position and said operating rod (13a) toward a position corresponding to said playing position,

a lifting spring (27) biases said lift lever (3) toward said removal position.

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**5,036,415**

**MAGNETIC HEAD SUPPORTING DEVICE WITH PREDETERMINED SURFACE ROUGHNESS TO MINIMIZE DEWING AND ADHERENCE**

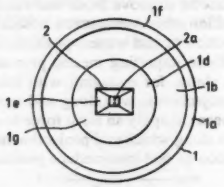
**Shuichi Nagamori, and Toru Yoshida, both of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan**

**Filed May 5, 1989, Ser. No. 348,236**

**Claims priority, application Japan, Aug. 23, 1988, 63-207429**

**Int. Cl.[5] G11B *21/20***

**U.S. Cl. 360—104** **1 Claim**




1. In a magnetic head supporting device including a support member for supporting a magnetic head in opposed relationship to a magnetic disk, said support member being formed with an outer peripheral projection to define a recess inside thereof, wherein when said magnetic disk is rotated in proximity to said recess, there is generated a partial vacuum in a space defined between said magnetic disk and said recess to suck said magnetic disk into said recess;

the improvement wherein a surface of said outer peripheral projection of said support member facing said magnetic disk has a predetermined surface roughness permitting communication of air between inside and outside of said recess and permitting suction of said magnetic disk into said recess due to said partial vacuum during rotation of said magnetic disk at a high speed, wherein said predetermined surface roughness is within the range of 0.1 S to 0.6 S.

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**5,036,416**

**AERODYNAMICALLY RELEASABLE LOCK FOR A DISK FILE ACTUATOR ASSEMBLY**

**Mark D. Mastache, Boise, Id., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Apr. 3, 1990, Ser. No. 504,373**

**Int. Cl.[5] G11B *5/54, 5/12***

**U.S. Cl. 360—105** **5 Claims**

1. In a disk drive having a housing, a rotatably mounted stack of memory disks in said housing, concentric track recordings on the surfaces of said disks, an actuator assembly supported in said housing, whih includes a moveable actuator body, arms mounted on said moveable actuator body to project between said disks, magnetic heads on the ends of said arms, between said disks, means for moving said actuator assembly to move said magnetic heads substantially radially of said concentric track recordings from and to a landing zone on said disks removed from said track recordings, the improvement which comprises;

an actuator lock having an air vane and a latch member;

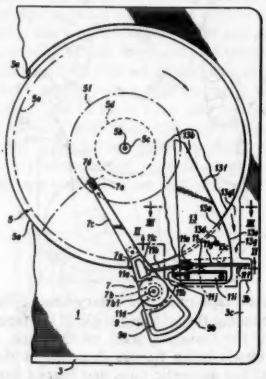
means movably mounting said actuator lock adjacent said moveable actuator assembly;

a catch member on said moveable actuator assembly for engagement by said latch member when said magnetic heads are positioned in said landing zone;

biasing means coupled to said actuator lock to bias said actuator lock to engage said latch member with said catch member when said magnetic heads are in said landing zone;

a van structure comprising a base secured to said housing;

individually fixed vanes on said base individually projecting between adjacent disks to deflect moving air from between said disks, generated by disk rotation; and



means in said housing defining with said vane structure an air passage converging and narrowing towards said air vane and having an opening adjacent said air vane for exhausting air in said passage against said air vane to move said air vane of said actuator lock and the attached latch member to release said latch member from said catch member.

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**5,036,417**

**MAGNETIC HEAD FEEDING DEVICE WITH A RACK AND PINION**

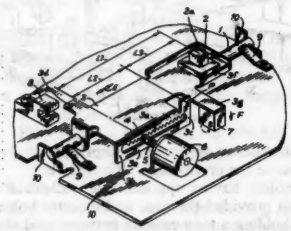
**Tomoe Aruga, and Hideya Yokouchi, both of Nagano, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan**

**Continuation of Ser. No. 94,480, Sep. 3, 1987, abandoned. This application Jul. 19, 1990, Ser. No. 554,655**

**Claims priority, application Japan, Sep. 3, 1986, 61-207035; Oct. 22, 1986, 61-251084; Nov. 25, 1986, 61-280311; Feb. 24, 1987, 62-40581; Feb. 24, 1987, 62-40582**

**Int. Cl.[5] G11B *5/55, 21/08***

**U.S. Cl. 360—106** **52 Claims**



1. A magnetic head feeding device comprising:

a guide;

a carriage slideably and rotatably mounted on the guide, the carriage being reciprocally moveable in a direction along the guide;

a magnetic head mounted on the carriage;

a rack member formed with an opening for defining a rack mounted on the carriage and extending essentially parallel to the direction along the guide, the rack member includ-

ing stop means and disengagement prevention means integrally formed in the rack member;

a pinion means engaged with the rack for moving the carriage along the guide when the pinion means is rotated;

motor means for rotating the pinion means in a reciprocating manner; and

an output shaft rotated by the motor means, the pinion means being mounted on the output shaft;

the stop means controlling the rotation of the pinion means and the movement of the carriage and comprising the opening formed in the rack, a first side wall and an opposed second side wall at the respective ends of the rack to stop rotation of the pinion means at the ends of the rack, and the disengagement prevention means preventing disengagement of the rack from the pinion means and including a disengagement wall opposite and spaced from the rack, the distance between the disengagement wall and the rack being slightly greater than the dimension of the pinion means.

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**5,036,418**

## MAGNETIC TAPE RECORDER WITH SHIELDING DEVICE FOR CONTACT-FREE SIGNAL TRANSFER BETWEEN COMPONENTS MOVED RELATIVE TO ONE ANOTHER

**Hartmut Willmann, Gross-Zimmern; Ludwig Dittmann, Berlin; Richard Heinz, Mühltal, and Jörn Lützeler, Zwingenberg, all of Fed. Rep. of Germany, assignors to BTS Broadcast Television Systems GmbH, Darmstadt, Fed. Rep. of Germany**

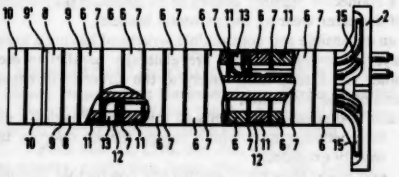
**PCT No. PCT/DE88/00086, § 371 Date Oct. 19, 1988, § 102(e) Date Oct. 19, 1988, PCT Pub. No. WO88/06783, PCT Pub. Date Sep. 7, 1988**

**PCT Filed Feb. 19, 1988, Ser. No. 272,889**

**Claims priority, application Fed. Rep. of Germany, Feb. 25, 1987, 3705928**

**Int. Cl.[5] G11B** *5/52*

**U.S. Cl. 360—108** **1 Claim**




1. Magnetic tape recorder with a device for contact-free transfer of signals between components moving in relation to each other, comprising

a receiving spindle (3) of magnetic, electroconductive material;

a plurality of transformer ring pairs (6, 8, 10) of a magnetizable material, mounted on said receiving spindle (3), each transformer ring having a transformer winding (12) with leads;

a plurality of short-circuit rings (7, 9, 11) mounted on said receiving spindle (3); wherein

said leads are electromagnetically shielded from each other, in the vicinity of each transformer ring pair, by respective surrounding shielding tubes (15) of a non-magnetic but efficiently electroconductive material, and wherein

said shielding tubes (15) of the transformer leads are each permanently connected electrically and mechanically with the receiving spindle (3) and are connected in an electrically conductive manner with the short-circuit rings (7, 9, 11).

**5,036,419**

## ELECTRO-MECHANICAL TRANSDUCING ELEMENT AND A MOVING DEVICE USING THE SAME

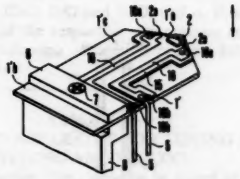
**Shigeki Okauchi, Tokyo, and Masaya Maeda, Kanagawa, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 628,457, Jul. 6, 1984, abandoned. This application Jul. 15, 1987, Ser. No. 75,202**

**Claims priority, application Japan, Jul. 12, 1983, 58-126334**

**Int. Cl.[5] G11B** *5/58, 7/09, 21/10*

**U.S. Cl. 360—109** **20 Claims**



1. In an electro-mechanical transducing element for moving at least one electrical device in response to a supplied electrical signal, said element being generally elongated in shape with a first free and movable portion to which said electrical device is attached, and a second relatively fixed portion affixed to a relatively fixed supporting device, said element having an elongated surface extending between said first and second portions,

the improvement comprising:

at least one elongated electrically conductive portion adapted to be electrically connected to said electrical device, said electrically conductive portion being arranged between said first and second portions and extending lengthwise along the elongated element, said electrically conductive portion including an insulating flexible printed circuit plate cemented substantially continuously along and to the surface between said first portion and a position near said second portion of said electro-mechanical transducing element, and extending from said first portion to a position near said second portion, and said electrically conductive portion being formed as a conductive pattern printed on said printed circuit plate.

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**5,036,420**

## SURGE ABSORBER

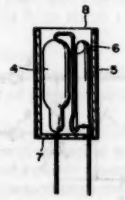
**Toru Yoshimura; Akio Uchida; Takaaki Ito, and Nobuya Saruwatari, all of Saitama, Japan, assignors to Mitsubishi Mining & Cement Co., Ltd., Tokyo, Japan**

**Filed Jul. 28, 1989, Ser. No. 387,595**

**Claims priority, application Japan, Jul. 29, 1988, 63-188062**

**Int. Cl.[5] H02H** *9/06*

**U.S. Cl. 361—118** **5 Claims**




1. A surge absorber composed of a microgap type surge absorbing element and a varistor, each of said surge absorbing element and said varistor being arranged as a structural element physically separate from the other, said separate surge absorbing element and said varistor being electrically connected in series with each other, said varistor having a varistor

voltage lower than a predetermined line voltage and having a voltage nonlinearity factor $\alpha$ between 1 and 20.

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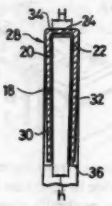
5,036,421

## DISC CARTRIDGE HAVING AN IMPROVED SHUTTER CONFIGURATION

Hiroshi Kaneda, Saku, and Masaru Ikebe, Komoro, both of Japan, assignors to TDK Corporation, Tokyo, Japan

Filed May 31, 1989, Ser. No. 359,111
Int. Cl.[5] G11B 23/03
U.S. Cl. 360—133 10 Claims




1. A disc cartridge comprising:

a casing having a slide area section formed thereon and adapted to receive a disc which is adapted to rotate therein;

said slide area section being defined by an upper surface, a lower surface, and a side surface of a part of said casing, and formed with at least one pickup inserting hole; and

a shutter formed of upper and lower shutter plates interconnected through distal ends therof into a substantially U-shape structure and having a distal opening defined at the free ends of said upper shutter plate and said lower shutter plate, a thickness of at least one of said upper and lower shutter plates uniformly decreasing in thickness in a direction towards said distal opening;

said shutter being slidably fitted on said slide area section of said casing to selectively expose said pickup inserting hole;

said upper and lower surfaces of said slide area section of said casing being obliquely formed in such a manner that a distance between said upper surface and said lower surface is reduced toward said distal opening of said shutter fitted on said slide area section.

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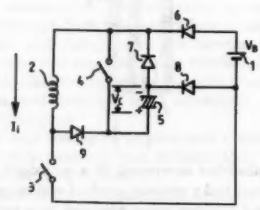
5,036,422

## SOLENOID PUMP DRIVING CIRCUIT

Akito Uchida, and Daiji Uehara, both of Ueda, Japan, assignors to Kabushiki Kaisha Nagano Keiki Seisakusho, Tokyo, Japan

Filed May 12, 1989, Ser. No. 350,880
Claims priority, application Japan, May 13, 1988, 63-62263[U]
Int. Cl.[5] H01H 47/00
U.S. Cl. 361—159 6 Claims




1. An intermittent driving circuit for an inductive load, comprising:

a DC power source (1) for supplying a driving current, said DC power source having a positive terminal and a negative terminal;

an inductive element (2) coupled to said power source, said inductive element having first and second terminals and producing a driving force when the driving current flows therein;

a first switching element (3) coupled between said power source and said inductive element for interrupting and driving current from flowing in said inductive element, said inductive element generating a counter-electromotive force when the flow of the driving current in said inductive element is interrupted;

capacitive storage means (5) connected to said inductive element for accumulating the counter-electromotive force; and

a releasing circuit comprising a second switching element (4) connected to said first switching element and connected to said capacitive storage means for discharging the counter-electromotive force accumulated in said capacitive storage means directly through said inductive element upon closure of said connected first and second switching elements.

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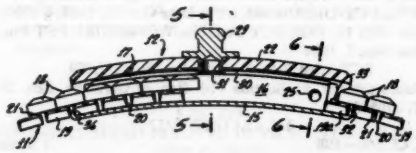
5,036,423

## ADJUSTABLE METAL ANTISTATIC BRACELET

Eric A. Williams, West Covina, Calif., assignor to Desco Industries, Inc., Walnut, Calif.

Filed Apr. 30, 1990, Ser. No. 516,423
Int. Cl.[5] H05F 3/02
U.S. Cl. 361—212 11 Claims




1. An adjustable metal antistatic bracelet, which comprises:

(a) a connector member shaped to be disposed on the wrist of a wearer wearing the antistatic bracelet,

(b) an expansible and contractible wristband having a lower layer of lower links that are generally parallel to each other and extend transversely to the direction of expansion of said wristband,

each two adjacent ones of said lower links having a gap therebetween into which flange means may be upwardly extended,

said lower links being electrically conductive, the links of said wristband being resiliently connected to each other,

(c) means to connect one end of said wristband to one end of said connector member,

(d) means to connect the other end of said wristband adjustably to the other end of said connector member,

said last-named means comprising flange means on said other end of said connector member and shaped to extend upwardly into one of said gaps between said lower links,

the degree of tightness or looseness of said wristband depending on the one of said gaps into which said flange means is extended,

(e) means to hold down said wristband at a location sufficiently close to said flange means that said flange means will tend strongly to remain in whichever of said gaps it is extended into,

(f) cap or cover means mounted over said connector member,

said cap or cover means and an outer side of the wristband being electrically insulating, to thus minimize the

chances of undesired electrical contact between an external object and a wearer wearing said wristband, said cap or cover means having an electrical connector stud thereon for connection to a grounding lead, and

(g) means to electrically connect said stud to said lower links.

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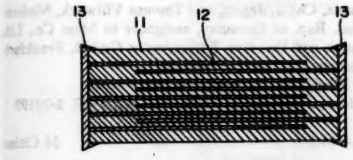
5,036,424

## MULTILAYER CERAMIC CAPACITIVE ELEMENT

Yoichiro Yokotani, Suita; Hiroshi Kagata, Katano; Junichi Kato, Osaka; Seiichi Nakatani, Hirakata, and Yukio Terada, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed May 18, 1990, Ser. No. 525,024
Claims priority, application Japan, May 18, 1989, 1-124830
Int. Cl.[5] H01G 4/10
U.S. Cl. 361—321 1 Claim




1. A multilayer ceramic capacitor comprising plural ceramic dielectric layers laminated one on another, and at least two internal electrodes separated by the ceramic dielectric layer and alternately terminated at the opposite sides of the laminated ceramic dielectric layers, said ceramic dielectric layers being composed of a complex oxide including a component (A), a component (B), and copper, said component (A) being at least one element selected from the group consisting of Pb, Ca, Sr and Ba, but containing Pb at the least, said component (B) being at least two elements selected from the group consisting of Mg, Ni, Zn, Ti, Ta, Nb and W, the molar ratio of said component (A) to component (B) being not less than 0.985, but not more than 1.110, the content of said copper in said complex oxide being more than 0.650 wt %, but not more than 2.200 wt % in terms of $Cu_2O$, said internal electrodes being composed of copper or an alloy mainly comprising copper.

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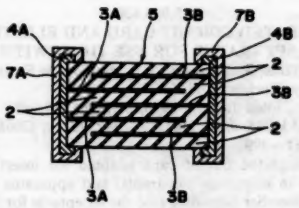
5,036,425

## MONOLITHIC CERAMIC CAPACITOR

Nagato Omori, Nagaokakyo; Harunobu Sano, Kyoto; Yoshiaki Kohno, Nagaokakyo, and Yukio Sakabe, Kyoto, all of Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Feb. 21, 1990, Ser. No. 482,980
Claims priority, application Japan, Feb. 22, 1989, 1-44407
Int. Cl.[5] H01G 4/08
U.S. Cl. 361—321 8 Claims




1. A monolithic ceramic capacitor comprising a plurality of dielectric ceramic layers united into one body, a plurality of internal electrodes formed between adjacent dielectric ceramic layers, and external electrodes formed on opposite sides of said united ceramic layers each being connected to alternate internal electrodes, said internal electrodes being formed from a copper or a copper alloy and said dielectric ceramic layers being formed from a dielectric ceramic composition including strontium titanate, bismuth oxide and an antireducing agent which prevents said composition from reduction, said antireducing agent having a composition expressed by the general formula:

$$\alpha MnO_2+\beta RO+\gamma B_2O_3+(1-\alpha-\beta-\gamma)SiO_2, \text{ or}$$

$$\alpha Li_2O+\beta RO+\gamma B_2O_3+(1-\alpha-\cdot-=)SiO_2, \text{ or}$$

$$\alpha ZnO+\beta RO+\gamma B_2O_3+(1-\alpha-62-\gamma)SiO_2,$$

wherein RO is at least one oxide selected from the group consisting of MgO, CaO, SrO and BaO, and $\alpha$, $\beta$, and $\gamma$ are molar percentages of the respective components and take a value within the following respective ranges, $5 \leqq \alpha$, $\leqq 20$, $10 \leqq \beta \leqq 60$, $20 \leqq \gamma \leqq 40$.

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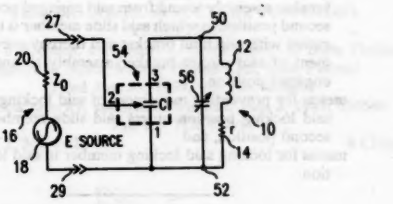
5,036,426

## METHOD AND APPARATUS FOR TUNING AND MATCHING AN NMR COIL

Gary G. Shen, Arlington, Tex., assignor to Board of Regents, The University of Texas System, Austin, Tex.

Filed Feb. 22, 1990, Ser. No. 483,577
Int. Cl.[5] H01G 4/38; G01R 33/20
U.S. Cl. 361—329 25 Claims




1. A differential capacitor, comprising:

first, second and third terminals;

means for varying a first capacitance across said first and second terminals, a second capacitance across said first and third terminals remaining substantially constant and independent of the value of said capacitance across said first and second terminals, a third capacitance defined across said second and third terminals;

said second capacitance being substantially equal to the inverse of the sum of (a) the inverse of said first capacitance and (b) the inverse of said third capacitance.

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5,036,427

## DRAWOUT CIRCUIT BREAKER APPARATUS

Thomas J. Krom, and Leonard G. Castillo, both of Seneca, S.C., assignors to Square D Company, Palatine, Ill.

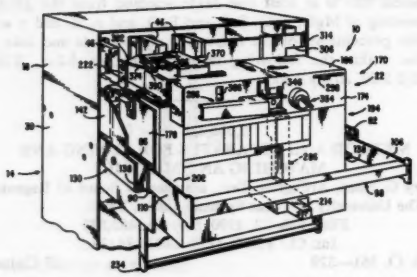
Filed Aug. 16, 1989, Ser. No. 395,113
Int. Cl.[5] H01H 9/20; H02B 11/12
U.S. Cl. 361—339 29 Claims

29. An apparatus comprising

a compartment including a frame, a limit bracket fixed to said frame, and a pair of primary contacts supported by said frame,

a drawout circuit breaker assembly including a circuit breaker having an operating handle movable between a circuit open position and a circuit closed position, a frame, and a pair of primary contacts supported by said assembly frame, said circuit breaker assembly being movable between a disengaged position wherein said circuit breaker assembly primary contacts are out of engagement with said compartment primary contacts, and an engaged position wherein said circuit breaker assembly primary contacts are engaged with said compartment primary

contacts, and said circuit breaker assembly further including a locking member supported by said assembly frame for movement between an unlocking position wherein said locking member permits movement of the circuit breaker operating handle to the circuit closed position, and a locking position wherein said locking member prevents movement of the circuit breaker operating handle to the circuit closed position, and a slide member supported by said frame for movement between a first position in which said slide member is not in communication with said limit



bracket and thereby permits movement of said circuit breaker assembly to and from said engaged position, and a second position in which said slide member is in communication with said limit bracket and thereby prevents movement of said circuit breaker assembly to and from said engaged position,

means for preventing movement of said locking member to said locking position unless said slide member is in said second position, and

means for locking said locking member in said locking position.

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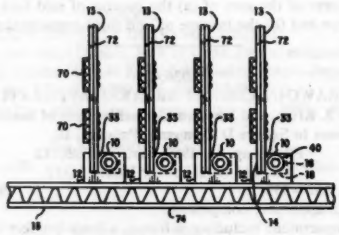
**5,036,428**

**PRINTED CIRCUIT BOARD RETAINER ASSEMBLY**

**Richard Brownhill, Huntington Beach, and Martin D. Husted, Canyon Country, both of Calif., assignors to EG&G Birtcher, Inc., El Monte, Calif.**

**Filed Jun. 29, 1990, Ser. No. 545,553**
**Int. Cl.[5] H05K *7/20***
**U.S. Cl. 361—386** **13 Claims**



1. An assembly for holding printed circuit boards, comprising:

a rod;

a plurality of members slidably mounted end-to-end on said rod, at least one of said members having a predetermined width and an internal longitudinal channel with a transverse dimension greater than the corresponding outside dimension of said rod to permit movement of said one member along a transverse path relative said rod, said one member and members adjacent said one member each having end portions engageable one another and shaped to force said one member to move in a first direction along said transverse path relative said adjacent members upon forcing of said adjacent members toward said one member;

means for selectively applying force to move said adjacent members towards said one member;

a base structure having first and second side walls defining a recess for receiving said rod and said plurality of members mounted on said rod and for receiving an edge of a printed circuit board adjacent said members, said base structure having an abutment fixedly disposed at one end of said recess, said abutment having an aperture formed therethrough for receiving said rod; and

means, disposed between said abutment and one of said adjacent members, for urging said members away from said abutment upon release of said selectively applied force.

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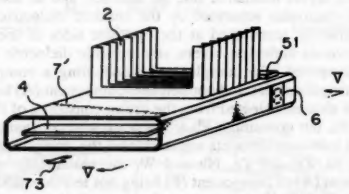
**5,036,429**

**IC CARD ADAPTER**

**Takashi Kaneda, Chiba, Japan, and Thomas Villwock, Niedernhausen, Fed. Rep. of Germany, assignors to Mips Co., Ltd, Tokyo, Japan and Dataline Technologies GmbH, Frankfurt-Niedernhausen, Fed. Rep. of Germany**

**Filed Aug. 11, 1989, Ser. No. 392,454**
**Claims priority, application Japan, Feb. 27, 1989, 1-20199**
**Int. Cl.[5] H05K *7/00***
**U.S. Cl. 361—392** **16 Claims**



1. An IC card adapter connectable to an electronic device, said adapter holding a plurality of individual IC cards and comprising a housing having a card receptor portion for simultaneously receiving the plurality of individual IC cards, the individual IC cards being readily detachable from the card receptor portion, and the adapter further comprising an indicator for indicating a selected IC card and a connector portion provided at least in the front portion of the housing, said connector portion for electrically and mechanically connecting the adapter to an electronic device, the card receptor portion receives the IC cards in a direction generally perpendicular to a direction in which an electronic device receives the connector portion, the connector portion being insertable in an electronic device.

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**5,036,430**

**INTEGRATED CIRCUIT CARD AND ELECTRONIC APPARATUS FOR USE THEREWITH**

**Robert G. Hills, Spencerport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jun. 18, 1990, Ser. No. 539,660**
**Int. Cl.[5] H05K *5/00*; H01R *13/447, 13/64*; G06K *19/18***
**U.S. Cl. 361—399** **15 Claims**

7. A integrated circuit card adapted for insertion into a receptacle in electronic apparatus, said apparatus having an operative member extending into the receptacle for detecting a correct-way card insertion, said card comprising:

a substrate including one or more memory elements;

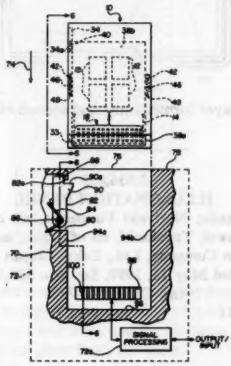
a contact pattern provided on said substrate for connecting the memory elements to the electronic apparatus;

a card-shaped case enclosing said substrate and having an access opening in a surface thereof at a position overlying

said contact pattern, said card having lateral edges that are so oriented as to guide the card into the space enclosed by said receptacle in said electronic apparatus;

one-way insertion means included on a lateral edge of said case for limiting insertion thereof into said enclosed space to only one orientation of said case, said one-way insertion means included in a forward section of said case that first enters the receptacle during a correct insertion;

an opening recess disposed rearwardly from said one-way insertion means on said same lateral edge;



a shutter for opening and closing said opening, said shutter having a front surface for covering said contact pattern and a rear surface extending adjacent said opening recess;

means for biasing said shutter forward toward a closed position such that said contact pattern is covered; and

means depending from said shutter toward said rear surface thereof and extending into said opening recess for engaging said operative member in the electronic apparatus and cooperating therewith to drive said shutter to an open position exposing said contact pattern to said electronic apparatus.

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**5,036,431**

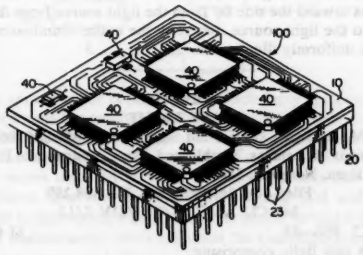
## PACKAGE FOR SURFACE MOUNTED COMPONENTS

**Kazumasa Adachi, Youro; Shinji Takahashi, Oogaki, and Kimitaka Hirabayashi, Mino, all of Japan, assignors to Ibiden Co., Ltd., Japan**

**Continuation of Ser. No. 163,777, Mar. 3, 1988, abandoned. This application Aug. 11, 1989, Ser. No. 393,013**

**Int. Cl.[5] H05K** *1/14*

**U.S. Cl. 361—412** **10 Claims**



1. An integral package for mounting surface-mounted electronic components and for establishing electrical connections with external circuitry comprising:

a first board having opposed front and rear faces including electrically conducting contact portions disposed on said front face thereof for mounting surface-mounted components and first plated-through through-holes extending through said first board wherein the first plated-through through-holes are electrically connected to respective ones of said contact portions;

a second board having opposed front and rear faces including second plated-through through-holes and electrically conducting pins disposed in the second plated-through through-holes in electrical contact with the respective second plated-through through-holes and protruding from said rear face of said second board for establishing electrical connections to external circuitry; and

an electrically conducting layer interposed between and in contact with said rear face of said first board and said front face of said second board which electrically connects respective ones of the first plated-through through-holes on the first board with corresponding ones of the second plated-through through-holes on said second board, wherein said first board, said electrically conducting layer, and said second board are bonded together as an integral unit and the first plated-through through-holes are laterally displaced in said package from the respective electrically connected second plated-through through-holes.

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**5,036,432**

## PLASTIC SHELL STRUCTURE FOR RADIO TELEPHONE

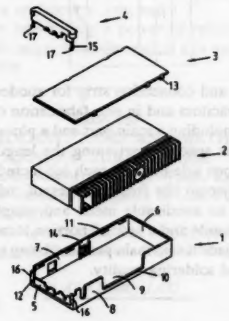
**Lasse J. Uronen, and Matti J. Saarela, both of Salo, Finland, assignors to Nokia Mobile Phones Ltd., Salo, Finland**

**Filed Jan. 31, 1990, Ser. No. 473,921**

**Claims priority, application Finland, Feb. 3, 1989, 890540**

**Int. Cl.[5] H05K** *7/00*

**U.S. Cl. 361—422** **8 Claims**



1. A shell for a radio telephone, wherein a radio telephone unit may be disposed in a final assembly step, comprising:

an integral box-like base having a planar bottom, two side walls and two end walls, said walls being positioned perpendicularly to said bottom, said two side walls and one of said end walls being of equal height, the other end wall being lower in height, apertures being provided in said other end wall at the ends thereof near the intersections with said side walls, upper portions of the insides of said two side walls being provided with L-shaped grooves having intersecting legs, one of said legs being oriented substantially parallel to said planar bottom and the other said leg opening toward the upper edge of the associated side wall, a groove provided in each of said side walls perpendicular to said bottom and near said intersections with said other end wall;

a substantially planar cover similar in shape to said planar bottom, two opposite edges of said cover being provided with locking elements, the number and location of said

locking elements corresponding with the number and location of said L-shaped grooves of said side walls;

a locking part for insertion into said grooves, said locking part including flexible locking tongues having enlarged tip ends, said tip ends being engaged in said apertures of said other end wall when said shell is assembled, said cover being locked to said base by respective engagement of said locking elements on said cover with said L-shaped grooves, said cover being further locked to said base by the locked presence of said locking part.

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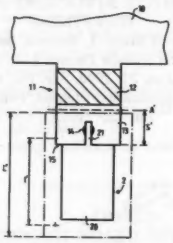
**5,036,433**

## CONNECTION STRIP FOR ANODES OF ELECTROLYTIC CAPACITORS AND METHOD FOR THE FABRICATION OF ELECTROLYTIC CAPACITORS USING SUCH A STRIP

**Francois Delalande, Saint Pierre de Bresse, and Georges Boulloy, Dijon, both of France, assignors to Compagnie Europeenne de Composants Electroniques LCC, Courbevoie, France**

**Filed Apr. 4, 1990, Ser. No. 503,965**
**Claims priority, application France, Apr. 21, 1989, 89 05318**
**Int. Cl.[5] H01G *9/06***
**U.S. Cl. 361—529** **9 Claims**



1. A transfer and connection strip for anodes of SMC type electrolytic capacitors and in situ fabrication of such capacitors, said strip including a main part and a plurality of substantially lateral tabs spaced apart along the length of said main part at least at one side thereof, each tab including a first portion located adjacent the free end thereof, said first portion being made of an anodizable metal and adapted to be connected to said anode and a second portion located on said tab substantially adjacent said main part and being made of a material having good soldering quality.

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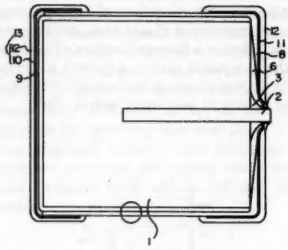
**5,036,434**

## CHIP-TYPE SOLID ELECTROLYTIC CAPACITOR AND METHOD OF MANUFACTURING THE SAME

**Atsushi Kobayashi, Tokyo, Japan, assignor to NEC Corporation, Japan**

**Filed Dec. 15, 1989, Ser. No. 451,173**
**Claims priority, application Japan, Dec. 15, 1988, 63-317961**
**Int. Cl.[5] H01G *9/00***
**U.S. Cl. 361—540** **10 Claims**

1. A chip-type solid electrolytic capacitor comprising a capacitor element having a first surface, a second surface opposed to said first surface, and a third surface extending between said first surface and said second surface, an anode lead wire extending outwardly from said first surface, a cathode layer formed on said second surface and said third surface, an insulating layer coated on said first surface and said third surface, a first electroless plated layer directly formed onto said insulating layer at a region located on said first surface so as to be electrically connected to said anode lead wire, a first solder layer formed onto said electroless plated layer, a second electroless plated layer formed on said cathode layer, and a



second solder layer formed onto said second electroless plated layer.

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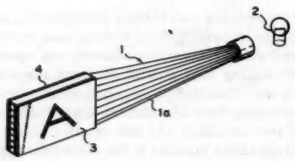
**5,036,435**

## ILLUMINATION PANEL

**Shuichirou Tokuda; Noriyuki Furukawa, all of Nagoya, and Yoshinori Kawai, Toyohashi, all of Japan, assignors to Mitsubishi Rayon Company, Ltd., Tokyo, Japan**

**Filed May 21, 1990, Ser. No. 525,697**
**Int. Cl.[5] F21V *7/04***
**U.S. Cl. 362—31** **10 Claims**



1. An illumination panel, which comprises an optical fiber sheet formed by arranging a plurality of optical fibers having a core-sheath structure, which has at least one end optically connected to a light source and a light-leaking portion on at least one surface thereof, a surface panel arranged on the front surface side of the optical fiber sheet, and a reflecting layer arranged on the back surface side of the optical fiber sheet, wherein the light-leaking portion is formed of a plurality of flaws extending to the core of the optical fiber from the sheath thereof, the light-leaking width of the light-leaking portion increases toward the side far from the light source from the side near to the light source, the presence density of the flaws increases toward the side far from the light source from the side near to the light source, and the depth of the flaws increases toward the side far from the light source from the side near to the light source, whereby the entire illumination surface is uniformly illuminated.

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**5,036,436**

## TASK LIGHT

**Paul M. Rattigan, 151 Circuit St., Norwell, Mass. 02061, and Thomas M. Lemons, Marblehead, Mass., assignors to Paul M. Rattigan, Norewell, Mass.**

**Filed Jun. 14, 1990, Ser. No. 538,259**
**Int. Cl.[5] A61G *13/00*; F21V *7/12***
**U.S. Cl. 362—33** **11 Claims**

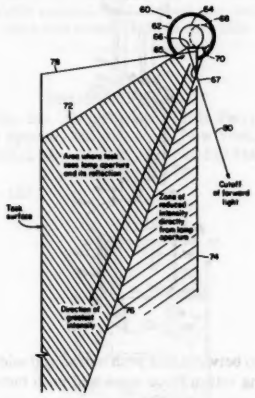
1. A task light, comprising:

an aperture fluorescent lamp having a narrow elongated light-emitting aperture along its length for emitting a lighting field generally symmetrical around an aperture axis;

a lamp housing spaced from and substantially surrounding

the lamp having an elongated opening at least partly aligned with the lamp aperture; and

an elongated reflector proximate and along one side of said housing opening for redirecting light from one side back


Area where lamp
Zone of reduced intensity directly from lamp aperture
Cutoff of forward light
Task surface
Direction of greatest intensity

across the aperture axis to create an asymmetrical illumination field elongated on one side of said axis for more evenly lighting a task area, and for blocking forward light to reduce direct glare from the lamp.

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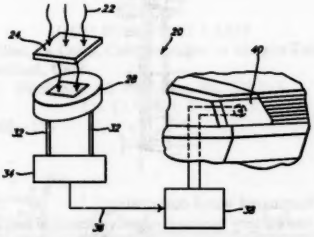
**5,036,437**

## VEHICLE LAMP CONTROL SENSOR

**Harold R. Macks, Royal Oak, Mich., assignor to Lectron Products, Inc., Rochester Hills, Mich.**

**Filed Sep. 4, 1990, Ser. No. 577,206**
**Int. Cl.[5] B60Q *1/04***
**U.S. Cl. 362—61** **15 Claims**



1. An apparatus for controlling a vehicle lamp comprising:

sensor means for receiving ambient light, said sensor means providing an electrical signal in response to said ambient light;

filter means disposed between said sensor means and said ambient light for selectively transmitting said ambient light to said sensor means, said filter means having a spectral transmissivity curve such that the combination of the sensor means and filter means will have a spectral response that approximates the spectral sensitivity curve of the human eye; and

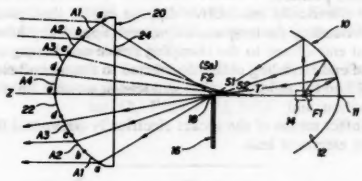
means responsive to said sensor means for turning said vehicle lamp on or off at predetermined ambient light levels.

**5,036,438**

## PROJECTOR-TYPE HEAD LAMP FOR MOTOR VEHICLES

**Yutaka Nakata, Isehara, Japan, assignor to Ichikoh Industries, Ltd., Tokyo, Japan**

**Filed Mar. 30, 1990, Ser. No. 502,224**
**Claims priority, application Japan, Mar. 31, 1989, 1-78520**
**Int. Cl.[5] B60Q *1/00***
**U.S. Cl. 362—61** **5 Claims**



1. A projector-type head lamp for motor vehicles, comprising:

a reflector having a concave inner reflecting surface;

a light source;

a shade with a cut-off edge and a projection lens;

at least 2 foci formed on a straight line defining an optical axis of the reflector such that the rays of light emitted from said light source are reflected in a direction crossing said optical axis, said light source being disposed close to one of said foci, said cut-off edge of said shade being disposed in the vicinity of the other focus;

said projection lens comprising a central lens in which said optical axis lies and a peripheral lens extending outwardly from said central lens, said central lens further having a first focal point proximately along said optical axis, and said peripheral lens having a second focal point proximately along said optical axis; and

said projection lens having a power of refraction which is progressively larger from the optical axis toward the outer circumference.

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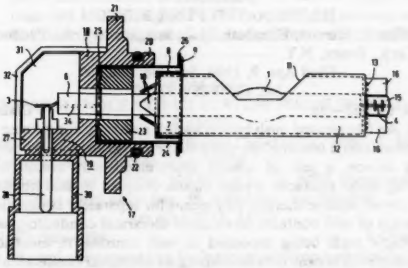
**5,036,439**

## CAR HEADLIGHT LAMP AND METHOD OF MANUFACTURING SAME

**Friedrich Hoffmann, Alsdorf, and Leo Wings, Eschweiler, both of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Nov. 6, 1989, Ser. No. 433,063**
**Claims priority, application Fed. Rep. of Germany, Nov. 4, 1988, 3837511**
**Int. Cl.[5] B60Q *1/00***
**U.S. Cl. 362—61** **6 Claims**



1. An improved car headlight lamp of the type comprising a longitudinally extending lamp envelope having first and second electrical leads extending from respective sealed first and

second ends of the envelope, a socket, and holding means for attaching the envelope to the socket, characterized in that the lamp comprises:

a. an electrically conductive tubular bush part of the socket having an outwardly extending flange;

b. an electrically conductive tubular clamping sleeve having an outwardly extending flange affixed to the flange of the bush at a transversely adjusted position and having a plurality of inwardly directed resilient members bearing on the first end of the envelope at a longitudinally adjusted position;

c. an electrically conductive dipping cap at least partially surrounding the lamp envelope, said dipping cap having a first end affixed to the clamping sleeve and having a second end including means connected to the second electrical lead for rigidly holding said lead at a stable transverse position; and

d. contact means of the socket electrically connected to the first electrical lead.

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**5,036,440**

**ILLUMINATION TYPE KEYTOP**

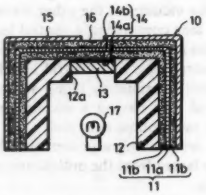
**Yasuo Takii, and Hitoshi Fujino, both of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan**

**Filed Feb. 16, 1990, Ser. No. 481,485**

**Claims priority, application Japan, May 23, 1989, 1-58661[U]; May 25, 1989, 1-59688[U]; May 25, 1989, 1-59689[U]**

**Int. Cl.[5] F21Q** *3/00*

**U.S. Cl. 362—95** **4 Claims**




1. An illumination type keytop, in which a display portion having a predetermined shape, which is transparent, is disposed in a part of a light intercepting layer so as to face on the top surface side and said display portion is illuminated with light coming from the rear side, comprising:

a transmitted light restricting member disposed on the rear side of said light intercepting layer, at least opposite to said display portion, which has an optical anisotropy and makes light pass through, depending on the incident angle; and

a colored and transparent filter member disposed on the rear side of said transmitted light restricting member.

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**5,036,441**

**ILLUMINATED PUSH BUTTON**

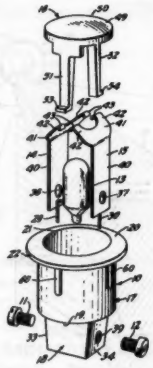
**William L. Herron, Elizabeth, N.J., assignor to Trine Products Corp., Bronx, N.Y.**

**Filed Apr. 9, 1990, Ser. No. 506,469**

**Int. Cl.[5] F21V** *33/00*

**U.S. Cl. 362—95** **9 Claims**

1. An illuminated push button switch assembly comprising in combination a housing, an electrically energizeable light emitting device, a pair of spaced apart electrically conductive spring metal contacts, a push button coupled to said housing for travel relative thereto, and means for separately connecting to each of said contacts an external electrical conductor, said contacts each being mounted in said housing in electrical contact with means for establishing an electrical connection to said light emitting device, said contacts being disposed within said housing for engagement by said push button which upon depression causes said contacts to flex and engage closing an electrical circuit shunting said light emitting device and completing a circuit for an external source through said means for connecting an external electrical conductor, said contacts



being interposed between said push button and said housing for exerting a spring return force upon said push button.

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**5,036,442**

**ILLUMINATED WAND**

**Joseph T. Brown, 1710 Halsey, Independence, Kans. 67301**

**Filed Dec. 20, 1990, Ser. No. 630,503**

**Int. Cl.[5] A63B** *15/02*

**U.S. Cl. 362—102** **20 Claims**

1. An illuminated wand comprising:

at least one battery having a negative terminal and a positive terminal on opposite ends thereof;

an elongated circuit board having a first electrical contact fixed on a leading edge thereof and a second electrical contact isolated from said first contact;

a movable contact electrically connected to said second contact by a length of flexible conductor;

an on-off switch mounted on said board;

a plurality of electric light sources spaced along the length of opposite faces of said board;

circuit means on said board for electrically connecting said switch and said light sources between said first and second contacts;

a rigid waterproof translucent tube means for encasing said at least one battery and said board in lengthwise relation-

ship with one of said battery terminals facing and aligned with said first contact; and

a pair of end caps, one slidably mounted in substantially watertight condition on each end of said tube means with said movable contact disposed between one of said end caps and the other of said battery terminals for securing said movable contact, said at least one battery and said board in electrical contact within said tube means.

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**5,036,443**

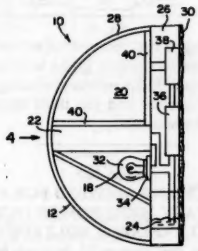
## PROXIMITY LIGHT

**Wayne Humble, 294 Waterside Dr., Little Ferry, N.J. 07643, and George Spector, 233 Broadway, New York, N.Y. 10007**

**Filed May 2, 1990, Ser. No. 517,816**

**Int. Cl.[5] F21L** *9/00*

**U.S. Cl. 362—183** **5 Claims**




1. A proximity light comprising:

(a) a housing;

(b) means for mounting said housing to a flat surface;

(c) an electrically operated light source carried within said housing;

(d) means carried within said housing, for supplying electric current to energize said light source; and

(e) a sensor switch carried within said housing and connected between said supplying means and said light source so as to close when it gets dark; further including a gravity operated mercury switch connected between said light source and said supplying means so that when said housing is mounted on the flat surface in a vertical position, said mercury switch will close.

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**5,036,444**

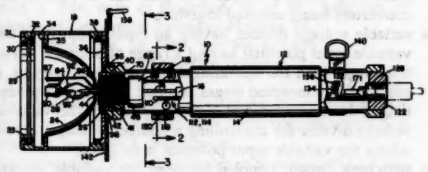
## HIGH INTENSITY LAMP

**Brian A. Hiles, La Costa, Calif., assignor to Malyne Enterprises, Inc., Carlsbad, Calif.**

**Filed Sep. 13, 1990, Ser. No. 581,757**

**Int. Cl.[5] F21L** *7/00*

**U.S. Cl. 362—188** **19 Claims**



1. A lamp, comprising:

an outer housing including a handle portion for gripping by a user and a head portion having a window opening for transmitting a light beam;

a parabolic mirror mounted in the head portion facing said window opening;

an electric arc light bulb mounted at the focus of the parabolic mirror;

adjustable mounting means for adjustably mounting said light bulb relative to said mirror for allowing an electrode gap in the bulb to be located at the focus of the mirror;

securing means for locking the bulb in a selected, adjusted position; and

power supply means for driving said electric arc bulb.

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**5,036,445**

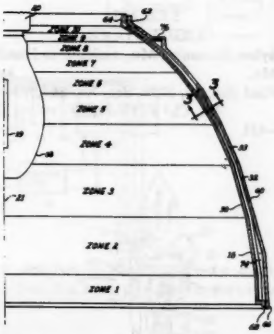
## MEANS AND METHOD FOR CONTROLLING THE UPLIGHTING PROPERTIES OF A LUMINAIRE HAVING A REFLECTOR OF SUBSTANTIALLY TRANSPARENT MATERIAL WITH A PRISMATIC OUTER SURFACE

**Mitchell M. Osteen, Zirconia, N.C., assignor to General Electric Company, Schenectady, N.Y.**

**Continuation-in-part of Ser. No. 281,117, Dec. 7, 1988, Pat. No. 4,903,180. This application Feb. 20, 1990, Ser. No. 482,127**

**Int. Cl.[5] F21V** *7/22, 5/02*

**U.S. Cl. 362—348** **20 Claims**




1. In a luminaire comprising a reflector of substantially transparent material and means for mounting a light source within said reflector, the reflector having a prismatic outer surface that has many double-reflecting prisms located at juxtaposed spaced locations along said outer surface, the individual prisms being characterized by having two reflecting surfaces that are disposed so that a large percentage of the rays from said source entering the individual prisms strike said reflecting surfaces at angles of incidence greater than the critical angle of incidence, thereby totally internally reflecting a large percentage of said light from said source, the improvement comprising:

means for controlling the amount of light passing from said source through said prismatic outer surface comprising an additive in particle form dispersed at least partially randomly within said transparent reflector material and serving to divert some of the light rays from said source into paths that intersect said reflecting surfaces at angles less than said critical angle of incidence, thereby causing said diverted rays to pass through said prismatic outer surface.

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**5,036,446**

## LAMP HANDLE COVER SYSTEM FOR SURGICAL LAMPS

**Roberto Quintanilla, and Alberto Quintanilla, both of 2900 Lebanon Ave., El Paso, Tex. 79930**

**Continuation of Ser. No. 235,978, Aug. 24, 1988, abandoned. This application Sep. 19, 1990, Ser. No. 585,290**

**Int. Cl.[5] F21L** *15/12*

**U.S. Cl. 362—399** **6 Claims**

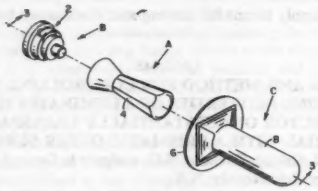
1. A semi-permanent handle for manipulating a pivotal lamp, comprising:

(a) means for gripping the handle;

(b) means for coupling the handle to the lamp; and

(c) locking means affixed to the handle to positively lock a

disposable handle cover into position over the handle to prevent contamination of a hand gripping the handle;



(d) said locking means comprises a hub and with ring means positioned about the hub, said ring means being biased into a locking position when the handle cover is in operative position over said handle.

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**5,036,447**

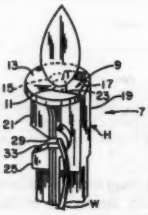
**LIGHT STAKE**

**Beverly W. Taylor, Hermann, Mo., assignor to Handi-Pac, Inc., Hermann, Mo.**

**Filed Jun. 29, 1990, Ser. No. 545,570**

**Int. Cl.[5] F21V *21/00***

**U.S. Cl. 362—431** **12 Claims**



1. In a stake for supporting an outdoor lighting fixture, the light fixture including a socket for a light bulb and electrical wiring connected to the socket, and the stake having a stem one end of which is insertable into the ground and to the other end of which a light fixture support is attached, the improvement wherein the support comprises an elongate housing having an opening in its upper end, the height of the housing being such that the socket fits within the housing when the fixture is installed on the stake, the light bulb protruding through the opening in the upper end of the housing when the socket is so installed, one side of the housing being open to allow insertion and removal of the socket, and the housing having means on at least one side thereof adjacent the open face to support the wiring for the fixture.

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**5,036,448**

**DC TO AC INVERTER AND METHOD FOR PRODUCING THREE PHASES FROM TWO INPUT PHASES**

**William M. Spencer, and Joseph S. Breit, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.**

**Filed Dec. 19, 1989, Ser. No. 452,425**

**Int. Cl.[5] H02M *5/06***

**U.S. Cl. 363—2** **29 Claims**

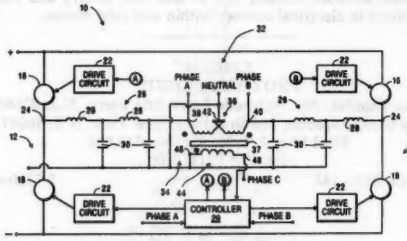
1. A power generating system comprising:

a first phase inverter producing a first phase AC output voltage from a DC potential;

a second phase inverter producing a second phase AC output voltage which is displaced nominally 120° from the first phase from the DC potential;

a vector adding circuit, responsive to the first and second phases, for vectorially adding voltages proportional to output voltages from the first and second phases to produce a resultant voltage which is inverted to produce a third phase having an output voltage which is displaced nominally 120° from the output voltages produced by the first and second phases; and wherein

the vector adding circuit comprises a transformer having a primary winding with a neutral coupled to a tap of the




primary winding, a first terminal of an end of the primary winding coupled to the first phase inverter and a second terminal of an end of the primary winding coupled to the second phase inverter and the third output phase being produced by the secondary.

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**5,036,449**

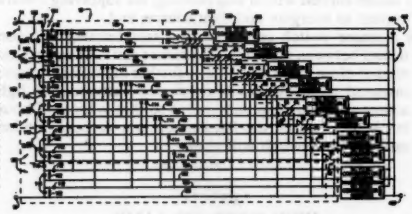
**POWER SUPPLY AND METHOD FOR PRODUCING HIGH VOLTAGE HIGH POWER OUTPUTS IN RESPONSE TO VARIABLE VOLTAGE DC INPUTS**

**John J. Dhyanchand, and Vietson M. Nguyen, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.**

**Filed Dec. 7, 1989, Ser. No. 447,573**

**Int. Cl.[5] H02M *3/24, 7/44***

**U.S. Cl. 363—15** **40 Claims**



1. A power supply for converting variable DC input potential to a DC output potential comprising:

a plurality of DC to DC converters, each converter operating in response to a DC input potential having an operating range, having an input for receiving a DC input potential which is variable in magnitude, and an output for producing the DC output potential, the outputs of the converters being coupled together;

a variable voltage divider having an input coupled to the variable input potential having a range of potential variation larger than the operating range of the converters, a plurality of connected stages coupled to the input potential, at least one control signal applied to the variable voltage divider for controlling a number of stages across which the variable input potential is dropped;

a switching circuit, coupled between the variable voltage divider and the plurality of converters, responsive to at least one switching control signal, for coupling an output potential developed by at least one of the stages to at least one of the converters as a DC input potential so that each converter to which an output potential from one of the stages is coupled has an input potential within an operating range of the converter; and

a controller, responsive to the variable input potential, for generating the at least one control signal and the at least

one switching signal as a function of the DC input potential.

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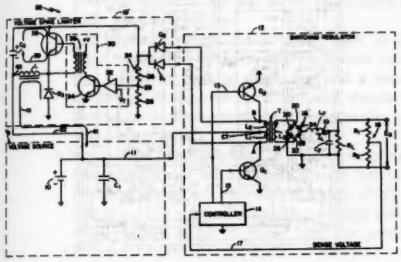
**5,036,450**

## SPIKE LIMITING CIRCUIT

John J. Kelleher, Jr., Peabody, and Donald W. Shute, Burlington, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Division of Ser. No. 312,797, Feb. 21, 1989. This application Jan. 25, 1990, Ser. No. 469,992
Int. Cl.[5] H02M *3/335*
U.S. Cl. 363—26 9 Claims



1. A voltage limiting circuit comprising:
(a) a capacitor fed by an input voltage;
(b) inductive means for storing energy;
(c) switching means, responsive to a control signal, for electrically coupling the capacitor to the inductive means to transfer energy corresponding to the input voltage stored in the capacitor to said inductive means and for electrically decoupling the capacitor from the inductive means to electrically couple the inductive means to an output of the circuit to transfer energy stored in the inductive means to said output; and
(d) means for controlling the switching means comprising:
means for producing a voltage proportional to the voltage stored in the capacitor; and
means, fed by the means for producing a proportional voltage and a reference voltage, for producing the control signal in response to changes in the voltage stored in the capacitor relative to said reference voltage.

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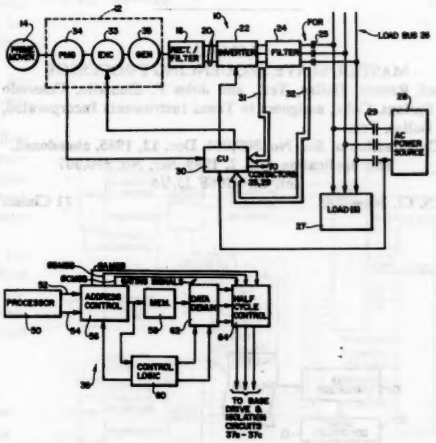
**5,036,451**

## INVERTER CONTROL WITH INDIVIDUAL PHASE REGULATION

Christopher J. Rozman, Park Ridge; Bradley J. Recker, and Derrick I. Roe, both of Rockford, all of Ill., assignors to Sundstrand Corporation, Arlington Heights, Ill.

Filed Dec. 28, 1989, Ser. No. 458,499
Int. Cl.[5] H02M *1/12*
U.S. Cl. 363—41 12 Claims

1. An inverter control for developing gating signals for switches in an inverter to produce N phase outputs where N is an integer greater than 1, comprising:
a single memory which stores bytes each comprising a number of bits;
means coupled to the memory for developing a series of memory addresses for each phase output, each series of memory addresses defining a phase output waveform to be produced;
means coupled to the developing means for accessing the memory with a memory address from each series thereof during each of a number of accessing cycles so that N bytes are provided at an output of the memory during each accessing cycle; and



a demultiplexer coupled to the memory for deriving the gating signals from the bytes provided at the output of the memory.

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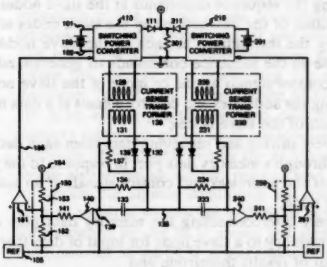
**5,036,452**

## CURRENT SHARING CONTROL WITH LIMITED OUTPUT VOLTAGE RANGE FOR PARALLELED POWER CONVERTERS

Thomas P. Loftus, Garland, Tex., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 28, 1989, Ser. No. 458,009
Int. Cl.[5] H02M *3/335*
U.S. Cl. 363—71 8 Claims



1. A power system including first and second power conversion circuits energizing a common load, comprising:
means for detecting an imbalance of current output supplied by the first and second power conversion circuits;
the first and second power conversion circuits each including independent reference voltage sources and current control circuits for controlling current output, including;
means responsive to the means for detecting for adjusting a

current output by adjusting the current control circuit; and

means for limiting responses to current imbalances to prevent a large voltage deviation at the common load including an amplifier with a limited response range selected to obtain a defined limited voltage range of the power conversion circuit and coupled to limit a range of output of the means for detecting an imbalance as applied to the means for adjusting.

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**5,036,453**

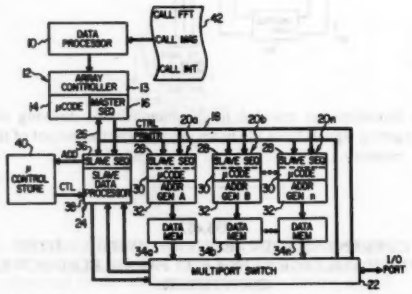
## MASTER/SLAVE SEQUENCING PROCESSOR

**Karl Renner, Dallas, Tex., and John P. Shanklin, Colorado Springs, Colo., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Continuation of Ser. No. 809,084, Dec. 12, 1985, abandoned. This application Aug. 2, 1989, Ser. No. 390,507**

**Int. Cl.[5] G06F *15/16***

**U.S. Cl. 364—200** **11 Claims**




1. A method for controlling instruction flow in a processor, comprising:

storing sequences of instructions in a plurality of slave nodes;

generating sequence commands in a master node during execution of each of a plurality of instructions contained therein;

receiving the sequence commands at the slave nodes during execution of the instructions by the slave nodes an d executing the instructions at each of the slave nodes in response to the sequence commands to generate addresses and control signals at one or more of the slave nodes;

receiving the addresses and control signals at a data memory in each of the slave nodes;

selectively storing and retrieving data from each data memory through a memory data port in response to the generation of the addresses and control signals at an associated slave node;

selectively interconnecting the memory data port of each data memory to a slave node for input of data thereto and output of results therefrom; and

receiving select ones of the sequence commands at a slave node and processing input data in accordance with one of a plurality of internal data processing functions in response to the sequence commands received from the master node;

wherein the execution of instructions at a slave node is sequenced synchronously and performed in parallel with the execution of instructions at other slave nodes.

**5,036,454**

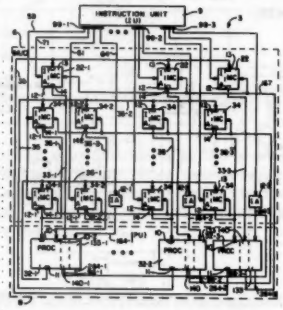
## HORIZONTAL COMPUTER HAVING REGISTER MULTICONNECT FOR EXECUTION OF A LOOP WITH OVERLAPPED CODE

**Bantwal R. Rau, Los Gatos, and Ross A. Towle, Union City, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Continuation of Ser. No. 45,884, May 1, 1987, abandoned. This application Apr. 24, 1989, Ser. No. 342,649**

**Int. Cl.[5] G06F *1/00***

**U.S. Cl. 364—200** **10 Claims**




1. A computer system for performing a plurality of iterations of a loop of instructions, the system comprising:

storage means for storing a set of instructions including a plurality of instructions defining a loop;

processor means having a plurality of processors each responsive to an instruction to perform an operation on an input operand and provide an output operand;

instruction means operative to receive the set of instructions from the storage means, to provide the instructions defining the loop to the processor means at substantially the same time such that each processor performs an operation in response to a different one of the instructions, and to generate input address offsets and output address offsets associated with various ones of the provided instructions;

in the instruction means, a multiconnect register including a plurality of iteration control register elements operative to enable different ones of the processors as a function of which iteration is being performed whereby different ones of the provided instructions are executed during different iterations,

invariant address means operative to provide a multiconnect pointer, to modify the multiconnect pointer in response to repeated execution of the provided instructions, and to combine the pointer with the address offsets to generate input and output operand addresses, respectively; and

multiconnect storage means having a plurality of addressable storage locations, operative to receive the operand addresses, furnish any operand which is stored at a location identified by the input operand address to the processor means, and store any output operand from the processor means at a location identified by the output operand address.

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**5,036,455**

## MULTIPLE POWER SUPPLY SENSOR FOR PROTECTING SHARED PROCESSOR BUSES

**John G. Atwood, San Jose, Calif., assignor to Tandem Computers Incorporated, Cupertino, Calif.**

**Filed Jul. 25, 1989, Ser. No. 385,330**

**Int. Cl.[5] G06F *11/30***

**U.S. Cl. 364—200** **3 Claims**

1. A power supply failure detection apparatus for preventing an individual malfunctioning processor unit from causing an

entire multi-processor system, having a plurality of individual processor units of which the malfunctioning processor is one, to experience a total failure, wherein each processor in the system has its own power supply which provides a set of N voltages and the system is interconnected for parallel processing by a plurality of interprocessor buses, comprising:

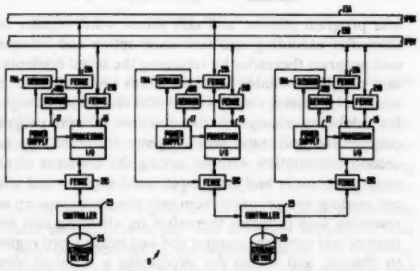
a reference voltage generator for supplying a reference voltage;

a first sensor circuit, responsive to a first subset, N1, of said N voltages with N1 being less than or equal to N, indicating that at least one of said first subset of voltages has changed by more than a predetermined threshold value, including,

a first plurality of N1 voltage processors each one for converting one of the first subset of voltages to a nominally standard voltage.

a first plurality of N1 comparators, each having a first input connected to receive the reference voltage from the reference voltage generator, and a second input connected to receive the nominally standard voltage from a respective one of said first plurality of voltage processors, and

a first output line connected to the output of each of the first plurality of N1 comparators for carrying a first fence-off signal from the first plurality of N1 comparators when the nominally standard voltage and the reference voltage differ by more than the predetermined threshold value:



a first fence connected to the first output line and a first one of the interprocessor buses for disconnecting the malfunctioning processor from the first one of the interprocessor buses when the first fence-off signal is received:

a second sensor circuit responsive to a second subset, N2 of said N voltages with N2 being less than or equal to N, indicating that at least one of said second subset of voltages has changed by more than the predetermined threshold value, including,

a second plurality of N2 voltage processors, each one for converting one of the second subset of voltages to a nominally standard voltage.

a second plurality of N2 comparators, each having a first input connected to receive the reference voltage from the reference voltage generator, and a second input connected to receive the nominally standard voltage from a respective one of said second plurality of voltage processors, and

a second output line connected to the output of each of the second plurality of N2 comparators for carrying a second fence-off signal from the second plurality of N2 comparators when the nominally standard voltage and the reference voltage differ by more than the predetermined threshold value: and

a second fence connected to the second output line and a second one of the interprocessor buses for disconnecting the malfunctioning processor from the second one of the interprocessor buses.

**5,036,456**

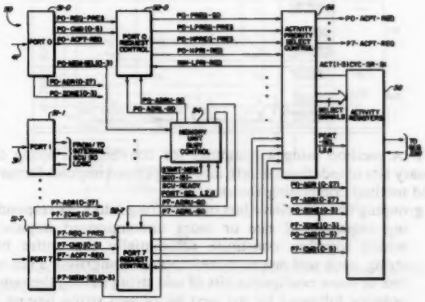
## APPARATUS FOR CONTROLLING CONCURRENT OPERATIONS OF A SYSTEM CONTROL UNIT INCLUDING ACTIVITY REGISTER CIRCUITRY

**Robert J. Koegel, Glendale, Ariz., assignor to Honeywell Information Systems Inc., Phoenix, Ariz.**

**Continuation of Ser. No. 14,554, Feb. 13, 1987, abandoned. This application Sep. 19, 1989, Ser. No. 409,982**

**Int. Cl.[5] G05F *13/14***

**U.S. Cl. 364—200** **6 Claims**



1. A synchronous data processing system comprising:

memory subsystem means including a plurality of memory units for executing memory operations;

input/out unit means (I/OU) for writing data into the memory subsystem and for reading data out of the memory subsystem;

central processor unit means (CPU) for writing data into and reading data out of the memory subsystem;

system controller unit means (SCU) having "n" ports, where "n" is an integer greater than one, a CPU means being operationally connected to one port, and an I/OU means being operationally connected to another;

a source of clock signals defining clock periods supplying such signals to the SCU;

said SCU means being operationally connected to the memory subsystem means for controlling access to the memory subsystem means by unit means connected to its ports in response to access request signal sets produced by said unit means; said SCU means including activity register means for concurrently controlling the execution of a maximum "p" SCU activities by the SCU means, where "p" is an integer greater than one, said SCU means and memory subsystem means having resources utilized in the execution of SCU activities by the SCU means, said SCU means also including activity register load control means for producing signals identifying the number of clock periods required to execute each SCU activity accepted for execution by the SCU means and signals identifying the resources of the SCU means and the memory subsystem means required for each clock period an SCU activity is in execution by the SCU means, circuit means for loading said signals into said activity register means; said SCU including circuit means utilizing potential conflicts between requests for an SCU activity and SCU activities in execution during each clock period; said SCU means not accepting a request for an SCU activity if there is such a potential conflict or if there are p SCU activities in execution by the SCU means at the same time.

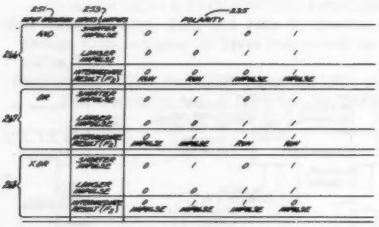
## 5,036,457
## BIT STRING COMPRESSOR WITH BOOLEAN OPERATION PROCESSING CAPABILITY

**Edward L. Glaser, Santa Monica; Paul R. DesJardins, Long Beach; Douglas W. Caldwell, Los Angeles, and Eliot D. Glaser, Van Nuys, all of Calif., assignors to Nucleus International Corporation, Culver City, Calif.**

**Continuation-in-part of Ser. No. 100,761, Sep. 24, 1987, abandoned. This application Apr. 22, 1988, Ser. No. 185,888**

**Int. Cl.[5] H03M *7/00***

**U.S. Cl. 364—200** **179 Claims**



1. A method using a computer for converting a string of binary bits of indefinite length into compressed impulse format, said method comprising the steps of:

grouping the successive bits of said string into a corresponding sequence of one or more uncompressed impulses which together constitute substantially the entire bit string, each said one or more impulses comprising a run of one or more contiguous bits of said string having the same polarity followed by the next bit of said string having a polarity opposite from said same polarity of the associated impulse; and

encoding each said one or more uncompressed impulses in sequence into a corresponding sequence of compressed impulse formats, one compressed format for each and every uncompressed impulse, said compressed impulse format comprising first and second binary bit coded indicators, said first indicator indicating the polarity of said one or more same polarity bits of the corresponding uncompressed impulse and said second indicator indicating the quantity of said same polarity bits grouped in the corresponding uncompressed impulse.

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## 5,036,458
## INFORMATION PROCESSOR EXECUTING INTERRUPTION PROGRAM WITHOUT SAVING CONTENTS OF PROGRAM COUNTER

**Osamu Matsushima; Yukio Maehashi; Shigetatsu Katori; Masahiro Nomura; Hiroko Shinohara; Kohichi Kariya, and Mitsue Abe, all of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan**

**Continuation of Ser. No. 707,617, Mar. 4, 1985, abandoned. This application Dec. 20, 1988, Ser. No. 287,622**

**Claims priority, application Japan, Mar. 2, 1984, 59-40004; Mar. 2, 1984, 59-40005; Mar. 2, 1984, 59-40006; Mar. 2, 1984, 59-40007; Mar. 2, 1984, 59-40009; Mar. 2, 1984, 59-40010; Sep. 6, 1984, 59-48681; Mar. 2, 1988, 5940008**

**Int. Cl.[5] G06F *9/40, 9/46***

**U.S. Cl. 364—200** **4 Claims**

1. An information processor comprising:

a program memory for storing a program to be executed;

a central processing unit for performing a normal program operation and an interruption operation; and

at least one interface unit to be coupled to peripheral equipment for transferring data between said central processing unit and said peripheral equipment,

said central processing unit including:

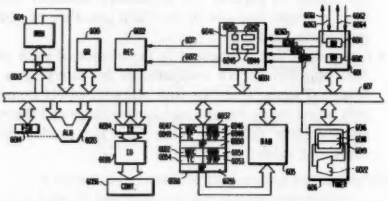
a program counter for reading said program out of said program memory;

a status word register for storing information representative of an execution condition of said central processing unit;

a stack memory for saving a content of at least one of said program counter and said status word register;

said interface unit including means for generating a first mode signal designating a first interruption which is executed after the contents of said program counter and said status word register are saved and wherein said program is resumed after completion of execution of said first interruption where the program was interrupted, and a second mode signal designating a second interruption which is executed without the contents of said program counter and said status word register being saved and wherein said program is resumed after completion of execution of said second interruption where the program was interrupted;

said central processing unit further including means, responsive to said first mode signal, for saving the contents of



said program counter and said status word register and thereafter executing said first interruption and resuming said program thereafter by returning the saved contents to said program counter and said status word register, respectively, means, responsive to said second mode signal, for inhibiting change in the contents of said program counter and said status word register and executing said second interruption without saving the contents of said program counter and said status word register and without reading any program from said program memory and resuming said program thereafter by allowing said contents of said program counter and said status word register to change, and means for producing a terminal signal when said second interruption is executed a plurality of times, wherein said generating means of said interface unit generates said first mode signal in response to said terminal signal.

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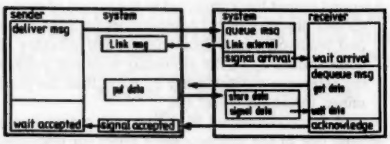
## 5,036,459
## MULTI-PROCESSOR COMPUTER SYSTEM WITH DISTRIBUTED MEMORY AND AN INTERPROCESSOR COMMUNICATION MECHANISM, AND METHOD FOR OPERATING SUCH MECHANISM

**Petrus A. M. den Haan, and Franciscus P. M. Hopmans, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Mar. 9, 1989, Ser. No. 321,412**

**Int. Cl.[5] G06F *15/16***

**U.S. Cl. 364—200** **9 Claims**




1. A multiprocessor computer system with distributed memory and an interprocessor communication mechanism, said

system comprising for transmitting a message from a sender node to a receiver node:

(a) in the sender node

(I) first local communication process means,

(II) sender process means for delivering a message,

(III) means for requesting a second local communication process means in the receiver node to queue said message;

(b) in the receiver node, said second communication process means, including

(I) first detecting means for detecting a queuing request from said requesting means,

(II) a first local memory facility,

(III) inspection means for inspecting the first local memory facility to determine whether the first local memory facility is available for storing said message,

(IV) local queuing control means for, if said first local memory facility is available, receiving and queuing said message to a local position of a waiting queue, which local position is in said first local memory facility, and for generating an arrival signal for said message, and for sending an acknowledge signal to said sender node,

(V) a receiver process means, coupled to receive said arrival signal,

(VI) non-local queueing control means for,

(A) if said first local memory facility is not available, arresting and queueing said message to a non-local position of the waiting queue, which non-local position is in a second local memory facility of the sender node, and

(B) generating a pendency signal with respect to said message to the receiver process means;

(VII) chaining means for, under control of any output signal of said detecting means, signalling, to an applicable local communication process of any node containing a most recent preceding message of the waiting queue, a link indication signal identifying the node containing said message, whereby said message becomes a next successor message in the waiting queue, and whereby when the first local memory facility is not available said waiting queue extends over a plurality of nodes;

(VIII) second detecting means, in the receiver process means, for after receiving either said arrival or said pendency signal, accessing a least recently activated position of the waiting queue and for detecting whether the least recently activated position is local or non-local;

(IX) first dequeueing means for, if said least recently activated position is local, dequeueing and accepting from said waiting queue, the message in said least recently activated position for processing in said receiver processing means;

(X) second dequeueing means for, if said least recently activated position is non-local,

(A) dequeueing the message in said least recently activated position by controlling an applicable communication process means of any node containing the least recently activated position of the queue to present the message in said least recently activated position;

(B) accepting the message for said receiver processing means from said least recently activated position;

(C) reactivating said second detection means until the queue be empty; and

(XI) acknowledge means for, after said accepting, transmitting an acknowledge signal to an applicable sender node.

**5,036,460**

## MICROPROCESSOR HAVING MISWRITING PREVENTING FUNCTION

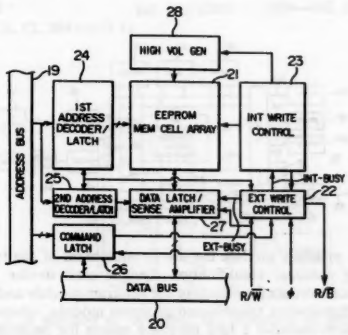
**Kenichi Takahira; Atsuo Yamaguchi; Shigeru Furuta; Takesi Inoue; Toshiyuki Matsubara, and Shuzo Fujioka, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Filed Oct. 26, 1988, Ser. No. 262,805**

**Claims priority, application Japan, Jun. 30, 1988, 63-160745**

**Int. Cl.[5] G06F** *5/00, 11/00*

**U.S. Cl. 364—200** **15 Claims**




1. A microprocessor system for incorporation in an IC card comprising:

a central processing unit;

a data bus in communication with said central processing unit for transfer of data bytes;

a memory cell array for storing data, said array being divided into a plurality of memory area pages, each page having a predetermined byte storage capacity;

data latch means connected to said memory cell array and in communication with said data bus for temporarily storing, in response to an enable signal, a number of bytes equal to the predetermined byte storage capacity of a page, received from said data bus, prior to storing the bytes in said memory cell array;

data latch enabling means connected to said data latch means and said central processing unit for enabling said data latch means, in response to an enable signal generated by said central processing unit, to temporarily store bytes received from said data bus;

interior write means, connected to said data latch enabling means, and said memory cell array, for transferring, in response to a write command signal generated by said central processing unit, from said data latch means, bytes temporarily stored in said data latch means to a page of said memory cell array;

time measurement means for measuring the time which elapses from generation of an enable signal by said central processing unit and while said data latch means receives from said data bus and temporarily stores a number of bytes equal to the predetermined byte storage capacity of a page in said data latch means, said time measurement means comprising overflow signal generating means for generating an overflow signal when the time measured by said time measurement means exceeds a predetermined limit; and

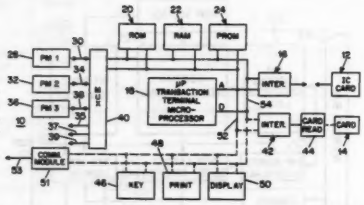
interior write suppression means connected to said interior write means and said time measurement means for preventing said interior write means, in response to generation of said overflow signal, from transferring bytes temporarily stored in said data latch means from said data latch means to said memory cell array.

**5,036,461**

## TWO-WAY AUTHENTICATION SYSTEM BETWEEN USER'S SMART CARD AND ISSUER-SPECIFIC PLUG-IN APPLICATION MODULES IN MULTI-ISSUED TRANSACTION DEVICE

**John C. Elliott, 3 Sunset Dr., Summit, N.J. 07901; James A. O'Connell, 108 Woodfield Dr., Short Hills, N.J. 07078; Lawrence Ladouceur, 250 Garth Rd., Scarsdale, N.Y. 10583; William Altman, 4619 Hillside Rd., Lower Paxton, Pa. 17109, and Keith Jarett, 20 Villanova Dr., Oakland, Calif. 94611**

Filed May 16, 1990, Ser. No. 525,159
Int. Cl.[5] G07F *19/00;* H04L *9/00;* G06F *15/30*
U.S. Cl. 364—408 1 Claim




1. A program module for use in equipment of the type accepting personal identification devices each device having identification data for selecting the program module and means for authenticating the selected program module, wherein said equipment includes a first interface means for receiving said personal identification devices and for generating first data signals corresponding to the stored identification data; a second interface means with at least one connector means for detachably receiving said program module; and processor means for transferring authenticating instructions between said personal identification device and the selected program module connected to said connector means; said program module comprising:

a module microprocessor for generating and receiving said authenticating instructions to and from said personal identification device;

module connector means for connecting said module microprocessor to said connector means for communication with said processor means;

a module program for operating said module microprocessor; and

program means for authenticating said personal identification device.

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**5,036,462**

## INTERACTIVE PATIENT ASSISTANCE AND MEDICATION DELIVERY SYSTEMS RESPONSIVE TO THE PHYSICAL ENVIRONMENT OF THE PATIENT

**Stephen B. Kaufman, Highland Park; Aleandro DiGianfilippo, Crystal Lake; Tamara L. Sager, Libertyville, and Alan R. Meyer, North Riverside, all of Ill., assignors to Healthtech Services Corp., Northbrook, Ill.**

Filed Sep. 29, 1989, Ser. No. 414,705
Int. Cl.[5] G06F *15/42;* A61J *1/03;* B65D *83/04*
U.S. Cl. 364—413.01 14 Claims

1. A medication delivery device comprising

physical testing means usable for measuring a preselected physical parameter including a testing device for the preselected parameter,

environment testing means for measuring at least one preselected parameter in the user's immediate environment including a sensor for the preselected condition,

medication delivery means for storing at least one dose of medication including a delivery mechanism for making the medication dose available to the user,

control means for comparing the preselected physical parameter measured by the testing device with the preselected environmental parameter measured by the sensor and for generating a first command signal when a predetermined correlation exists between the two parameters and for generating a second command signal in the absence of the predetermined correlation, and

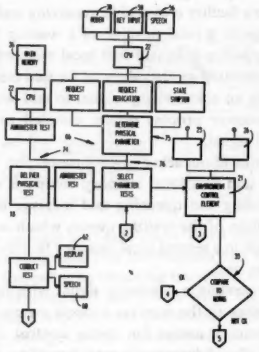
means for generating a first output in response to the first command signal and for generating a second output, different from the first output, in response to the second command signal, one of the first and second outputs actuating the delivery mechanism to dispense the medication dose.

13. A medication delivery system comprising

a housing,

first storage means for storing at least one dose of a medication within the housing away from access by the user,

second storage means separate from the first storage means for storing at least one dose of a medication within the housing away from access by the user,



first delivery means associated with the first storage means for selectively delivering a medication dose from the first storage means to the user,

second delivery means associated with the second storage means for selectively delivering a medication dose from the second storage means to the user,

environment testing means for measuring at least one preselected parameter in the user's immediate environment including a sensor for the preselected condition,

control means associated with the first and second storage means for actuating the first delivery means in response to a first criteria and for actuating the second delivery means in response to a second criteria different from the first criteria, one of the first and second criteria including, at least in part, a measurement of the preselected environmental parameter.

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**5,036,463**

## ANGIOSCOPIC SYSTEM AND METHOD FOR DIMENSIONAL MEASUREMENT INCLUDING MEASUREMENT OF THE DISTANCE FROM ANGIOSCOPIC ENDS TO DESIGNATED PLANES

**George S. Abela, and Stephan E. Friedl, both of Gainesville, Fla., assignors to University of Florida, Gainesville, Fla.**

Filed Nov. 23, 1988, Ser. No. 275,754
Int. Cl.[5] G06F *15/42*
U.S. Cl. 364—413.13 26 Claims

1. A system for angioscopic dimensional analysis comprising:

an optical fiber angioscope having a tip for insertion into the interior of a vessel;

a video camera connected to said angioscope;

a monitor to display images of the interior of a vessel from the tip of the angioscope; and

a computer connected to process data from said video cam-

era, said computer having storage means with stored coefficients for conversion of pixels into dimensional units for feature planes at any distance within an operational range of said tip; and

wherein said computer includes input means to receive data representative of the number of pixels corresponding to an unknown dimensional feature of an angioscopic image and processing means to quantify the dimensional feature by use of at least one appropriate coefficient to convert from pixels to dimensional units and by taking into account an actual distance, within said operational range, between said tip and the dimensional feature.

**11**. A method of measuring angioscopic dimensional features using an angioscopic dimensional analysis system having:

an angioscope having a tip;

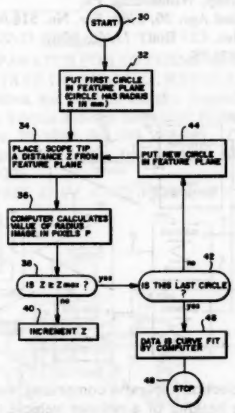
a video camera connected to said angioscope;

a motor to display images from the angioscope; and

a computer connected to process data from said video camera, said computer having stored coefficients for conversion of pixels into dimensional units for feature planes at different distances from said tip;

the steps comprising:

having the computer receive data representative of the number of pixels corresponding to an unknown dimensional feature of an angioscopic image; and




quantifying the dimensional feature by use of at least one appropriate coefficient to convert from pixels to dimensional units, and

wherein the computer receives data representative of the number of pixels corresponding to an unknown dimensional feature of an angioscope image with the tip positioned at a plurality of distances from a feature plane and further comprising the step of determining the distance from said tip to the feature plane based on changes in the data corresponding to moving the position of the tip an amount.

**15**. A method for use with an angioscopic dimensional analysis system having:

an angioscope having a tip;

a video camera connected to said angioscope;

a monitor to display images from the angioscope; and

a computer connected to process data from said video camera;

the steps comprising calibrating the system by:

placing at least one known pattern at a series of known distances from the tip of the angioscope such that the video camera generates a corresponding series of images composed of pixels;

measuring the number of pixels in a dimensional feature of the pattern having known dimensions for each image; having the computer calculate at least one coefficient for each known distance, each coefficient useful for conversion of pixels to dimensional units; and storing each of the coefficients.

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**5,036,464**

## METHODS OF DETECTING ENDOSCOPE INSERTION DIRECTION

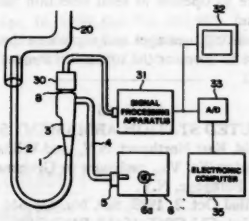
**Duncan F. Gillies, London, England; Gul N. Khan, Islamabad, Pakistan, and Yutaka Takahashi, Hachioji, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed May 15, 1990, Ser. No. 523,506**

**Claims priority, application United Kingdom, Nov. 24, 1989, 8926542**

**Int. Cl.[5] G06F *15/42***

**U.S. Cl. 364—413.13** **10 Claims**




**1**. A method of detecting the direction of insertion of an endoscope comprising the steps of:

forming a system of images including a plurality of picture images from an endoscope image, said picture images having a different number of picture image areas from the endoscope image;

extracting a largest uniform gray level region, including an average gray level and smallest variance of gray level within predetermined ranges, by examining the average gray level and variance of the gray level of respective picture image areas in said plurality of picture images formed by said forming step, said forming step and said extracting step are carried out in parallel, said extracting step includes using a u-link when said region is extracted, said u-link pertaining to a specific picture image area points to the specific picture image area itself where the average gray level and variance of the gray level of the specific picture image area are included within the predetermined ranges, where the average gray level and variance of the gray level of the specific picture image areas are not included within the predetermined ranges, said u-link pertaining to a specific picture image area points to a largest picture image area in which the average gray level and variance of the gray level of the specific picture image area are included within the predetermined ranges among respective picture image areas corresponding to said specific picture image area in a picture image at a lower plane of the system of images rather than a picture image to which said specific picture image area belongs; and

utilizing the region extracted by said extracting step as an endoscope insertion direction.

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**5,036,465**

## METHOD OF CONTROLLING AND MONITORING A STORE

**William H. Ackerman, Jr., Centreville, Va., and John P. Sainola, Sayville, N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.**

**Filed Oct. 3, 1989, Ser. No. 416,642**

**Int. Cl.[5] G06F *15/58*; F41F *7/00***

**U.S. Cl. 364—423** **16 Claims**

**1**. A method of controlling and monitoring a store connected

to a store station having a memory section and a power supply, the method comprising:

transmitting a store generic program portion from a source thereof and into the memory section of the store station, said store generic program portion being operable with a plurality of different types of stores;

invoking the generic program portion to determine the specific type of store connected to the store station;

transmitting a store specific program portion from a source thereof and into the memory section of the store station, said store specific program portion being operable with the specific type of store connected to the station; and

invoking the specific program portion to control and to monitor the store connected to the station, and including

(i) actuating the power supply to supply power to the store,

(ii) transmitting messages and signals from the station to the store to operate at least selection function of the store, and

(iii) transmitting messages and signals to the station from the store to monitor the operation thereof.

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5,036,466

## DISTRIBUTED STATION ARMAMENT SYSTEM

Frank Fitzgerald, East Northport, N.Y., and William H. Ackerman, Jr., Centreville, Va., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Oct. 3, 1989, Ser. No. 416,644

Int. Cl.[5] G06F *15/58;* F41F *7/00*

U.S. Cl. 364—423 12 Claims

1. A data management system for use with a plurality of different types of stores, the data management system comprising:

a central unit;

a plurality of distributed stations; and

means to transmit data between the central unit and the distributed stations;

the central unit including

(i) means to hold a plurality of store specific application programs, each of the store specific application programs being associated with one of the plurality of store types, each of the store specific application programs including means to control the transmission of data between a store of an associated type and one of the distributed stations, and

(ii) means to control the operation of the data management system, and including means to select any of the store specific application programs for transmission to any of the distributed stations of the data management system;

each of the distributed stations including

(i) means to connect the station to one store of any of said store types,

(ii) an input-output section to transmit data between the station and said one store that is connected to the station, and

(iii) means to hold any one of the store specific application programs.

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5,036,467

## METHOD AND APPARATUS FOR SENSING A VEHICLE CRASH IN REAL TIME USING A FREQUENCY DOMAIN INTEGRATION AND SUMMATION ALGORITHM

Brian K. Blackburn; Joseph F. Mazur, and Scott B. Gentry, all of Utica, Mich., assignors to TRW Vehicle Safety Systems Inc., Lyndhurst, Ohio

Filed Apr. 4, 1990, Ser. No. 505,362

Int. Cl.[5] G06F *7/70;* B60R *21/32, 25/10;* B60K *28/12*

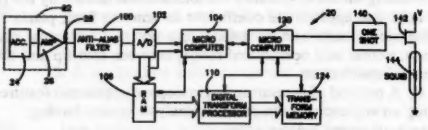
U.S. Cl. 364—424.05 25 Claims

1. An apparatus for controlling actuation of a passenger restraint system in a vehicle, said apparatus comprising:

sensing means for providing a time domain vibratory electric signal having frequency components indicative of a vehicle crash condition;

means for transforming the time domain vibratory electric signal over at least two time intervals into associated frequency domain signals;

means for integrating each of the frequency domain signals;




means for summing the integrals of the frequency domain signals; and

means for actuating the passenger restraint system when the sum of the integrals of the frequency domain signals indicates a predetermined type of vehicle crash is occurring.

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5,036,468

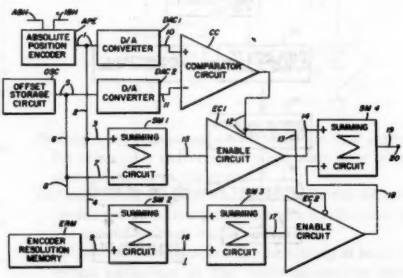
## ARRANGEMENT FOR READING AN ABSOLUTE POSITION ENCODER FOR DETERMINING THE OPERATING POSITION OF A BREAK HANDLE

Leonard Roselli, Verona, Pa., assignor to Westinghouse Air Brake COmpany, Wilmerding, Pa.

Filed Apr. 30, 1990, Ser. No. 516,600

Int. Cl.[5] B60T *13/66;* B06F *15/20*

U.S. Cl. 364—426.05 11 Claims




1. A brake selection apparatus comprising, handle means for controlling the braking of a railway vehicle, brake encoder means for monitoring the selected position of said handle means, offset means for storing an initial brake release position, a summing means for acertaining the difference between the selected brake position and the initial brake release position, means for comparing the selected brake position and the initial brake release position for activating an enable means to permit passage of the difference when the selected brake position is greater than the initial brake release position, and output means for producing a binary signal signifying the actual brake position.

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5,036,469

## PITCH ATTITUDE COMMAND FLIGHT CONTROL SYSTEM FOR LANDING FLARE

Scott L. Pelton, Renton, Wash., assignor to The Boeing Company, Seattle, Wash.

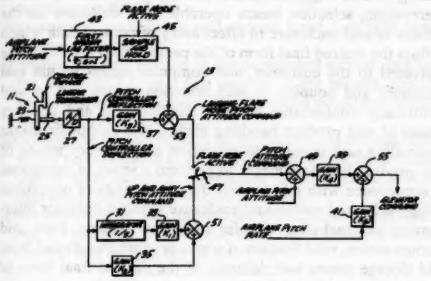
Filed Mar. 2, 1989, Ser. No. 319,255

Int. Cl.[5] B64C *19/00*

U.S. Cl. 364—428 14 Claims

1. In an aircraft maneuver command electronic flight control system wherein during up-and-away flight a continuing pitch axis control signal is produced by a continuing steady input applied to a pilot-operated pitch axis control device, the improvement comprising a flare mode modification that becomes

active during the flare portion of a landing, said flare mode modification including command modification means responsively connected to said pilot-operated pitch axis control device for receiving said pitch axis control signal and producing



an incremental pitch axis command relative to the pitch attitude of the aircraft at the start of flare based on the continuing steady input applied to said pilot-operated pitch axis control device.

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**5,036,470**

## METHOD AND APPARATUS FOR DETERMINING HIGH TEMPERATURE STATE OF AIR-FUEL RATIO SENSOR

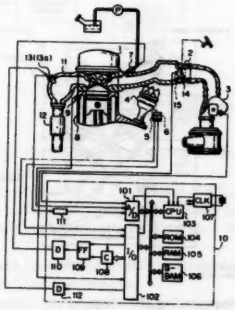
**Makoto Suzuki, Mishima, and Hiroshi Tanaka, Susono, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan**

**Filed Jun. 19, 1989, Ser. No. 368,245**

**Claims priority, application Japan, Jun. 20, 1988, 63-151685; Oct. 25, 1988, 63-269203**

**Int. Cl.[5] F02D *41/14, 41/22*; F02B *3/12***

**U.S. Cl. 364—431.06** **18 Claims**



3. A method of determining an element temperature of an air-fuel ratio sensor for detecting a concentration of a specific component in the exhaust gas of an internal combustion engine, comprising the steps of:

determining whether the output of said air-fuel ratio sensor indicates a lean state or a rich state of said engine;

calculating a lean-side extreme value of the output of said air-fuel ratio sensor when a lean state of said engine is indicated;

calculating a rich-side extreme value of the output of said air-fuel ratio sensor when a rich state of said engine is indicated;

calculating a mean value of said lean-side extreme value and said rich-side extreme value;

determining whether or not said mean value is on the rich side with respect to a predetermined value;

determining that said air-fuel ratio sensor is at a high temperature state when said mean value is on the rich side with respect to said predetermined value;

lowering the element temperature of said air-fuel ratio sensor to a low temperature state other than said high temperature state when said air-fuel ratio sensor is determined to be at said high temperature state; and

raising the element temperature of said air-fuel ratio sensor to said high temperature state when said air-fuel ratio sensor is at said low temperature state.

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**5,036,471**

## APPARATUS FOR ROAD PATH SEARCHING APPLICABLE TO CAR NAVIGATION SYSTEM AND OPERATION METHOD THEREOF

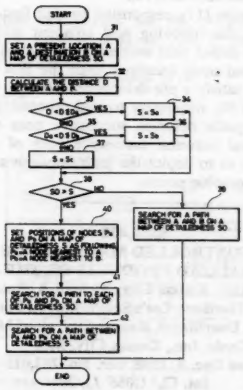
**Yutaka Tamura; Yoshio Hosokawa; Satoshi Noro, and Kazuhiko Kondo, all of Gifu, Japan, assignors to Sanyo Electric Co., Ltd., Japan**

**Filed Apr. 16, 1990, Ser. No. 509,991**

**Claims priority, application Japan, Apr. 18, 1989, 1-98335**

**Int. Cl.[5] G06F *15/50***

**U.S. Cl. 364—449** **12 Claims**



1. In a navigation system for processing stored electrical data representative of pre-defined locations within a given geographic area, apparatus for searching through said data to find a path between first and second geographic points situated within said area and for displaying the path comprising:

storage means (2) for storing electrical data which repeatedly defines a map of the area but at first and second different display levels, the data for the first and second display levels defining node locations that collectively represent roads situated in the area that are to be depicted at said each display level such that the first and second display levels collectively represent said map at first and second pre-defined levels of detail with the first level having more detail than said second level, the data being organized into respective first and second data groups for, respectively, the first and second display levels such that the data group for the first level includes the data group for the second level,

processing means (1, 3, 5, 6, 7, 8), operative in conjunction with the storage means, for determining the path between said first and second points comprising:

designating means (11), responsive to said first and second geographic points, for designating first and second positions on the first level of the map and corresponding to the first and second geographic points,

adjacent node detecting means (13), responsive to the first and second positions, for detecting a plurality of each of first and second node locations in the first level and respectively adjacent to said first and second positions

so as to yield corresponding first and second pluralities of adjacent node positions,

existence detecting means (14, 18), operative in response to said adjacent node detecting means, for detecting whether said second level contains at least one of each of the pluralities of said first and second adjacent node positions and for providing a result indicative thereof,

determining means (20, 21, 22), responsive to said adjacent node detecting means and to the result provided by said existence detecting means, for selecting one of each of the pluralities of said first and second adjacent node positions as the first and second positions such that if the pluralities of the first and second adjacent node positions contain node locations existing in said second level then the first and second positions are taken, in a predefined manner, to be respective ones of said node locations existing in the second level in preference to node locations existing at the first level in the pluralities of said first and second adjacent node positions; and

changing means (19), operative in response to the result provided by said existence detecting means, for subsequently changing the level of the map used by said adjacent node detecting means from the first to the second level in the event said first and second positions exist in said second level,

decision means (17), responsive to said first and second positions, for invoking said adjacent node detecting means to detect next successive pluralities of said first and second node locations until the first and second positions satisfy a pre-determined criteria, and

display means (4), responsive to said processing means, for displaying paths between successive ones of said first positions and between successive ones of said second positions so as to depict the path between said first and second geographic points.

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**5,036,472**

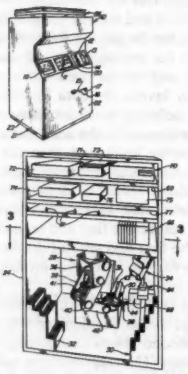
## COMPUTER CONTROLLED MACHINE FOR VENDING PERSONALIZED PRODUCTS OR THE LIKE

**Stephen P. Buckley, Kansas City; Richard A. Robinson, Parkville; John H. Hurlburt, Lee's Sumit; Kurt A. Pfahl, Leawood, and Arthur E. Doerflinger, Kansas City, all of Mo., assignors to Hallmark Cards, Inc., Kansas City, Mo.**

**Filed Dec. 8, 1988, Ser. No. 282,013**

**Int. Cl.[5] G06F** *15/20*

**U.S. Cl. 364—479** **28 Claims**



**1.** A machine for delivering a product which may be automatically personalized by the customer at the time of purchase and which is selected from a plurality of different products, said machine comprising: storage means for storing base products, delivery receptacle means, product handling means for effecting a series of operations and including electrically controllable transfer means for effecting transfer of a base product from said storage means, electrically controllable modification means for effecting modification of said base product to produce a modified base product and electrically controllable delivery means for effecting delivery of said modified base product to said delivery receptacle means, an enclosure containing said storage, receptacle and product handling means therewithin, selection means operable by a customer on the outside of said enclosure to effect entry of control data which defines the desired final form of the personalized product to be delivered to the customer, and computer means within said enclosure and coupled to said selection means and to said electrically controllable transfer, modification and delivery means of said product handling means, said computer means controlling said transfer, modification and delivery means of said product handling means to perform a series of operations in accordance with said control data, said series of operations being performed within said enclosure without operator intervention and including transfer of a base product from said storage means, modification of a base product transferred from said storage means and delivery of the desired final form of product from said modification means to said delivery receptacle means,

wherein said selection means includes display means arranged for display of said different products for selection by a customer.

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**5,036,473**

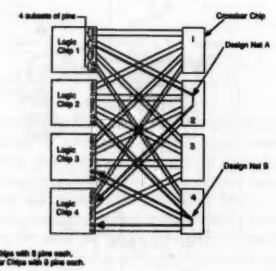
## METHOD OF USING ELECTRONICALLY RECONFIGURABLE LOGIC CIRCUITS

**Michael R. Butts, Portland, and Jon A. Batcheller, Newberg, both of Oreg., assignors to Mentor Graphics Corporation, Beaverton, Oreg.**

**Continuation-in-part of Ser. No. 254,463, Oct. 5, 1988, abandoned. This application Oct. 4, 1989, Ser. No. 417,196**

**Int. Cl.[5] G06F** *16/50*

**U.S. Cl. 364—489** **19 Claims**




**1.** A method comprising the steps:

providing first and second electrically reconfigurable logic circuits (ERCLCs);

providing first input data representative of a first digital logic network, said input data including primitives comprised of boolean logic gates, and nets interconnecting said primitives;

automatically partitioning said first input data into first and second portions;

providing the first portion of the partitioned first data to the first ERCLC so a first portion of the first digital logic network represented thereby takes actual operating form on the first ERCLC;

providing the second portion of the partitioned first data to the second ERCLC so a second portion of the first digital logic network represented thereby takes actual operating form on the second ERCLC;

interconnecting the first and second ERCLCs so that at least

one net specified in the first input data extends between the first and second ERCLCs;

providing second input data representative of a second digital logic network entirely unrelated to the first digital logic network except that both include primitives comprised of boolean logic gates, and nets interconnecting said primitives, and both are to take actual operating form on the same ERCLCs;

automatically partitioning said second input data into first and second portions;

providing the first portion of the partitioned second data to the first ERCLC so a first portion of the second digital logic network represented thereby takes actual operating form on the first ERCLC;

providing the second portion of the partitioned second data to the second ERCLC so a second portion of the second digital logic network represented thereby takes actual operating form on the second ERCLC;

interconnecting the first and second ERCLCs so that at least one net specified in the second input data extends between the first and second ERCLCs.

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**5,036,474**

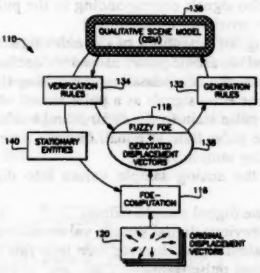
## MOTION DETECTION AND TRACKING FROM A MOBILE PLATFORM

**Bir Bhanu, New Brighton, Minn., and Wilhelm Burger, Linz, Austria, assignors to Honeywell Inc., Minneapolis, Minn.**

**Filed Mar. 31, 1989, Ser. No. 331,706**

**Int. Cl.[5] G01S 5/00**

**U.S. Cl. 364—516** **5 Claims**




1. A qualitative detection and tracking system for a mobile platform, comprising:

sensing means, mounted on the mobile platform, for acquiring images having entities, wherein each of the entities is either mobile or stationary relative to a world frame of reference;

selecting means, connected to said sensing means, for selecting features from the images;

matching means, connected to said selecting means, for matching the features of successive frames of the images, thereby resulting in two-dimensional displacement vectors between distinct features of the successive frames;

computing means, connected to said matching means, for computing possible focus of expansion locations within the images, from the two-dimensional displacement vectors;

combining means, connected to said computing means, for combining possible focus of expansion locations, thereby resulting in a fuzzy focus of expansion that indicates the approximate direction of heading and amount of rotation in space of the sensing means;

derotation means, connected to said computing means, for removing effects of rotation of said sensing means from the images so as to output derotated two-dimensional displacement vectors;

generating means, connected to said combining means and to said derotation means, for generating hypotheses of qualitative properties of entities in the images, that indicate which entities are in motion relative to the world frame of reference, which entities are stationary relative to the world frame of reference, and which entities are closer to the mobile platform;

qualitative scene model, connected to said generating means, for providing a qualitative three-dimensional representation of the images, wherein the three-dimensional representation is derived from the hypotheses; and

verification means, connected to said qualitative scene model, to said combining means and to said derotation means, for testing the hypotheses for consistency with changes occurring in the images and for deleting hypotheses that are inconsistent with changes occurring in the images, and, in turn, for indicating, according to the hypotheses that are consistent, stationary entities and mobile entities in the images, and for indicating the stationary entities to said computing means.

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**5,036,475**

## IMAGE MEMORY DATA PROCESSING CONTROL APPARATUS

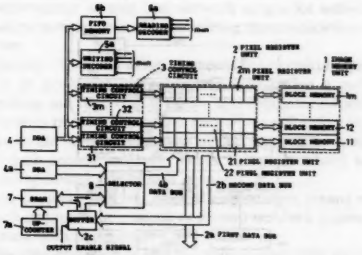
**Tomoaki Ueda, Kyoto, Japan, assignor to Daikin Industries, Ltd., Japan**

**Filed Nov. 2, 1988, Ser. No. 265,896**

**Claims priority, application Japan, Nov. 2, 1987, 62-278004; Nov. 2, 1987, 62-278005**

**Int. Cl.[5] G06F 3/14**

**U.S. Cl. 364—518** **20 Claims**



1. An image memory data processing control apparatus comprising:

an image memory unit including a plurality of block memories associated with different scanning lines in a scanning line direction of a display means which displays pixel data supplied from said image memory unit;

a linear interpolation operation unit for generating access address data for said image memory unit and pixel data in any scanning line direction for said display means;

pixel registers, each of which comprises a plurality of modules for holding pixel data that are continuous in the scanning line direction, each of said pixel registers being associated with a corresponding block memory;

timing control means for generating control signals based on access address data supplied from said linear interpolation operation unit, which control signals select said block memories and said pixel registers, each of said timing control means being associated with a corresponding block memory;

write decoding means for generating first module selection signals based on access address data supplied from said linear interpolation operation unit, which first module selection signals sequentially select a first predetermined number of modules of said pixel registers;

delay means for delaying transmission of access address data supplied from said linear interpolation operation unit by a predetermined period of time;

read decoding means for generating second module selection signals based on access address data supplied from

said delay means, which second module selection signals sequentially select a second predetermined number of modules of said pixel registers;

pixel data temporary holding means for continuously storing pixel data supplied from modules selected by said read decoding means, along a linear interpolation locus, and for supplying pixel data thus stored to modules selected by said write decoding means, addresses of said pixel data temporary holding means being successively changed in synchronism with operation of said linear interpolation operation unit;

selection means for selectively supplying pixel data generated by said linear interpolation operation unit or pixel data read out from said pixel data temporary holding means; and

operation means for executing a raster operation on the condition that pixel data read out from said pixel data temporary holding means have been selected.

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**5,036,476**

**PRINTER CONTROL SYSTEM**

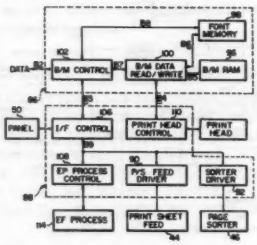
**Ikunori Yamaguchi, and Yoshikazu Ikenoue, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Apr. 10, 1989, Ser. No. 335,503**

**Claims priority, application Japan, Apr. 8, 1988, 63-87569; Jul. 8, 1988, 63-171480**

**Int. Cl.[5] G06F *15/00, 3/12***

**U.S. Cl. 364—519** **15 Claims**




1. An image reproducing apparatus for reproducing on a record medium an image corresponding to image data supplied from a data supply device, comprising:

a) image recording means for forming a visible image on a record medium,

b) first memory means for storing a plurality of process programs each for activating said image recording means,

c) program selecting means responsive to an instruction signal from said data supply device for selecting any one of said process programs,

d) control means for controlling said image recording means in accordance with the selected process program for enabling the recording means to reproduce on said record medium an image corresponding to the image data supplied from said data supply device,

e) second memory means for storing data for printing information for testing purposes,

f) memory control means for storing into said second memory means data corresponding to the selected process program,

g) instruction input means for entering an instruction for staring the printing operation for said testing purposes, and

h) second control means for controlling said image recording means to reproduce on the record medium an image corresponding to the data stored in said second memory means.

**5,036,477**

**METHOD FOR THE INTERFERENCE SUPPRESSION IN ULTRASONIC DISTANCE MEASUREMENTS**

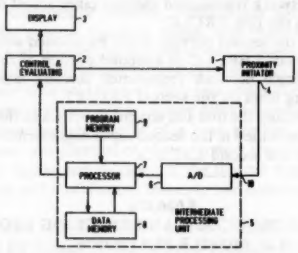
**Alfred Forster, Schwandorf, and Gerd Schorner, Amberg, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed Jun. 13, 1989, Ser. No. 365,415**

**Claims priority, application Fed. Rep. of Germany, Jun. 13, 1988, 3820103**

**Int. Cl.[5] G06F *15/20;* G06G *7/12***

**U.S. Cl. 364—567** **8 Claims**




1. A method for suppressing stochastic interference signals in ultrasonic distance measurements made with a device comprising an ultrasonic proximity initiator and a control and evaluating unit, comprising the steps of:

repeatedly sending out ultrasonic pulses of equal width with the ultrasonic proximity initiator;

receiving echo signals corresponding to the pulses with the ultrasonic proximity initiator; and

compensating for deviations of the echo signals relative to the emitted ultrasonic pulses caused by stochastic interference signals, the compensating comprising the steps of:

processing the echo signals as a pulse train;

feeding the pulse train to the control and evaluating unit;

sampling the pulse train at equal, discrete time intervals to form analog sample values;

converting the analog sample values into digital sample values;

weighting the digital sample values;

weighting previous digital sample values stored in memory for equivalent equal, discrete time intervals from at least one previous pulse trains;

forming new digital sample values by mathematically combining the digital sample values with the corresponding previous digital values;

storing the new digital values in place of the previous digital values; and

feeding the new digital values to the control and evaluating unit for further evaluation with respect to amplitude or pulse width.

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**5,036,478**

**COMPUTING THE LENGTH OF A RAILWAY VEHICLE OR A TRAIN OF SUCH VEHICLES**

**David B. MacDougall, Chippenham, United Kingdom, assignor to Westinghouse Brake and Signal Holdings Limited, Chippenham, United Kingdom**

**Filed Apr. 13, 1989, Ser. No. 337,503**

**Claims priority, application United Kingdom, May 9, 1988, 8810922**

**Int. Cl.[5] B61L *23/34;* G06F *15/48***

**U.S. Cl. 364—562** **9 Claims**

1. A system for computing length of a railway vehicle or a trian of such vehicles, said vehicle or train having a front and a rear, comprising:

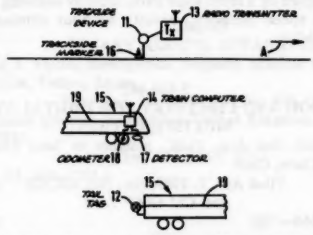
(a) computing means located on the vehicle or train;

(b) distance measuring means located on the vehicle or train, said distance measuring means being coupled with said

computing means for supplying the to information dependant on distance travelled by the vehicle or train;

(c) first detecting means, for detecting the passage of the front of the vehicle or trainpast a first fixed point and transmitting a first indication to said computing means in response to detecting the passage of the front of the vehicle or trian past said first fixed point; and

(d) second detecting means, for detecting the passage of the




rear of the vehicle or train past said first fixed point or a second fixed point a known distance therefrom and transmitting a second indication to said computing means in response to detecting the passage of the rear of the vehicle or trainpast said first fixed point or said second fixed point;

said computing means for computing a measure of the length of said vehicle or train based on distance travelled by the vehicle or train between reception by the computing means of said first and second indications.

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**5,036,479**

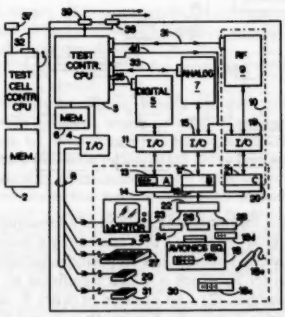
## MODULAR AUTOMATED AVIONICS TEST SYSTEM

**Leonard J. Prednis; Michael L. Proctor, both of San Diego, and Alan D. Sugarman, Poway, all of Calif., assignors to TRW Inc., Redondo Beach, Calif.**

**Filed Apr. 20, 1989, Ser. No. 341,020**

**Int. Cl.[5] G01D** *18/00*

**U.S. Cl. 364—580** **29 Claims**




16. In a manufacturing system for assembling and testing electronic units containing any combination of digital, analog and RF circuits, in various stages of assembly, the improvement wherein said manufacturing system includes:

a plurality of testing stations;

said plurality of testing stations being arranged in at least three groups, including:

a first group for testing printed wiring board assemblies,

a second group for testing electronic modules formed with said printed wiring board assemblies, and

a third group for testing electronic units formed with said electronic modules with said groups being arranged in a serial order of first, second and third in position in said assembly line;

each said testing station including:

test controller processor means;

processor controlled test instrumentation module means for providing test stimulus signals to a unit under test and receiving responses, said test instrumentation module means being under control of and responsive to commands issued by said test controller processor means;

test adaptor means for providing signal connections between said test instrumentation module means and a unit to be tested with said adaptor means being detachably connected to each of said module means and said unit under test;

said test controller processor means enabling said test instrumentation module means to provide test stimulus signals to units under test in a predetermined sequence and for storing responses provided to said test instrumentation module means by said units;

said manufacturing system further including:

a plurality of test station controller processor means, one of said plurality of test station controller means being associated with a corresponding one of said groups of test stations;

each of said test station controller processor means including:

memory means for storing information, including programs and data; and input and output means for inputting and outputting information from said memory means;

first network means for providing processor to processor communications to define a first path for sending and receiving information;

means coupling said plurality of test station controller processor means to said first network means for networking said processor means for permitting communication thereover;

a plurality of second network means for permitting processor to processor communications to define a path for sending and receiving program and data information, said plurality of second network means corresponding in number to the number of groups of said test stations with one of such second network means being associated with a corresponding one of said groups;

means coupling said test controller processor means within each group to the respective second network means associated with said group;

means coupling each of said test station controller processor means of each said group to a corresponding one of said plurality of second network means to enable the test station controller processor means associated with said respective group to communicate with all of said test controller processor means associated with said group, wherein information may be sent between said test controller processor means in said test stations of a particular group and said corresponding one of said plurality of test station controller processor means associated with said group.

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**5,036,480**

## METHOD AND APPARATUS FOR SIMULATING MICROBURST WINDSHEARS

**Terry L. Zweifel, and J. Rene Barrios, both of Phoenix, Ariz., assignors to Honeywell Inc., Minneapolis, Minn.**

**Filed Mar. 12, 1990, Ser. No. 492,000**

**Int. Cl.[5] G08B** *23/00*

**U.S. Cl. 364—578** **18 Claims**

1. A method for testing the effectiveness of a windshear alerting and flight guidance system for airborne use, by dynamically modelling the magnitude of a microburst windshear encounter with the aid of a digital computer and by generating a test signal to establish an alarm threshold at which it is prudent to provide a warning of rapidly changing winds, comprising:

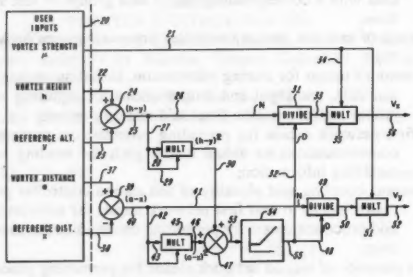
providing said computer with a stored program, said stored program comprising a plurality of vortex models, each

such model representing a particular plurality of concentric streamlines varying in strength, displacement relative to each other vortex model, and location of a center of each vortex model,

providing said computer with digital signals defining a desired vortex model configuration, said digital signals representative of at least a predetermined strength, height of a vortex center above a ground plane, a reference altitude with respect to said ground plane corresponding to a desired point of windshear encounter, a reference distance along said ground plane at said desired point of windshear encounter, and a distance of said vortex center from a given point of origin on said ground plane,

processing said digital signals in said computer to derive a further digital signal corresponding to thee vector value of a horizontal windshear component at said desired point of encounter,

providing said digital computer with a further stored program, said further stored program comprising a predetermined flight path of an aircraft,




processing said further stored program in said digital computer continuously to derive digital signals representative of vertical and horizontal positions of said aircraft along said flight path,

applying said derived aircraft positional signals to said digital computer to vary dynamically said signal corresponding to the vector value of a horizontal wind component and a vertical wind component in accordance with said flight path,

applying said dynamically varied signal to said windshear alerting and flight guidance system to activate an alarm indicating detection of a windshear, and

adjusting said windshear alerting and flight guidance system to establish an alarm threshold corresponding to predetermined values of said vertical and horizontal windshear components at which a stall condition of said aircraft is imminent.

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**5,036,481**

## PERSONAL COMPUTER SYSTEM WITH DUAL PURPOSE EXPANSION SLOT

**David R. Lunsford, Austin, and Joe E. Llamas, Round Rock, both of Tex., assignors to Dell USA Corporation, Austin, Tex.**

**Continuation of Ser. No. 340,102, Apr. 18, 1989, abandoned.**
**This application Jan. 22, 1991, Ser. No. 643,705**
**Int. Cl.[5] G06F *1/00***
**U.S. Cl. 364—708** **17 Claims**

1. A personal computer system having an I/O channel and a memory channel, and having a dual purpose expansion slot, comprising:

(a) a chassis;

(b) a main logic board mounted on the chassis and incorporating the I/O channel and the memory channel;

(c) a fixed number of expansion slots, including the dual purpose expansion slot, each occupying a fixed volume, positioned over the main logic board for providing space for selective connections of I/O devices, implemented on full length and short logic cards, to the I/O channel;

(d) a high speed memory system mounted on the main logic board and connected to the memory channel, occupying a fixed amount of space; and

(e) expansion high speed memory, mounted on the main logic board within the fixed amount of space, connected to the memory channel, and occupying a portion of the dual purpose expansion slot, the remaining portion being occupied by a short logic card, thereby enabling increased high speed memory capacity without eliminating I/O capability.

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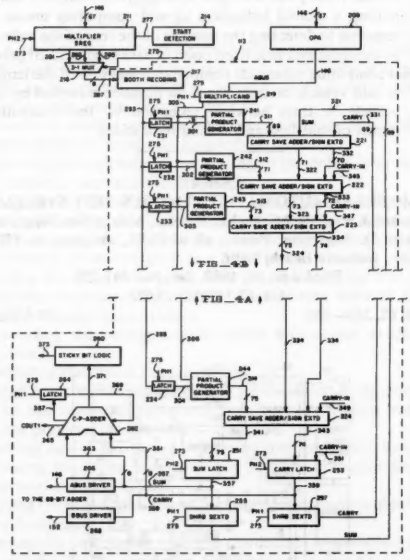
**5,036,482**

## METHOD AND CIRCUITRY FOR DIGITAL SYSTEM MULTIPLICATION

**Avtar Saini, San Jose, Calif., assignor to Intel Corporation, Santa Clara, Calif.**

**Filed Apr. 7, 1989, Ser. No. 335,125**
**Int. Cl.[5] G06F *7/52***
**U.S. Cl. 364—760** **14 Claims**




FIG—4A

FIG—4B

1. A method for optimizing a speed of a subsequent multiplication in a digital system of a first number by a second number, wherein the second number has bit positions including (1) a bit position of order X, which is a least significant bit position of the second number, (2) a bit position of order Y, and (3) a bit position of order Z, wherein X is less than Y, and Y is less than Z, comprising the steps of:

(a) detecting whether a string of consecutive zeroes occupies the bit positions of the second number beginning with the bit position X and increasing towards higher order bit positions;

(b) if no such string of consecutive zeroes exists, then using bit position X as a starting point for the second number for multiplication;

(c) if both (i) the string of consecutive zeroes exists and (ii) the string of consecutive zeroes has its highest order zero in a bit position having an order less than Y minus one, then using bit position X as a starting point for the second number for multiplication;

(d) if both (i) the string of consecutive zeroes exists and (ii)

the string of consecutive zeroes has its highest order zero in a bit position having an order less than Z minus one but greater than or equal to Y minus one, then using bit position Y as a starting point for the second number for multiplication;

(e) if both (i) the string of consecutive zeroes exists (ii) the string of consecutive zeroes has its highest order zero in a bit position having an order greater than or equal to Z minus one, then using bit position Z as a starting point for the second number for multiplication.

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**5,036,483**

## BINARY ADDING APPARATUS

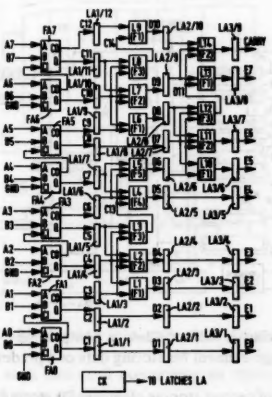
**Peter J. Virtue, Basingstoke, England, assignor to Sony Corporation, Tokyo, Japan**

**Filed Jan. 29, 1990, Ser. No. 471,473**

**Claims priority, application United Kingdom, Apr. 7, 1989, 8907873**

**Int. Cl.[5] G06F *7/50***

**U.S. Cl. 364—786** **19 Claims**



1. A binary adding apparatus for adding together a plurality of multi-bit input words to produce a multi-bit output word, the apparatus comprising:

clock generating means for producing a clock signal having a clock period;

a plurality of adding means for each adding bits of said multi-bit input words of equal significance to produce a sum bit, said plurality of adding means all having substantially the same propagation delay and being arranged in a plurality of cascaded groups in the order of significance of the bits of the input words, each of said plurality of cascaded groups being operative to produce a respective carry-out bit, the number of the adding means in each of said plurality of cascaded groups being selected such that the total propagation delay through said plurality of cascaded groups is less than said clock period;

a plurality of first latching means for each latching a sum bit or respective significance output by a respective one of said plurality of adding means;

a plurality of second latching means for each latching a carry-out bit output by a respective one of said plurality of cascaded groups of adding means;

a plurality of output word latching means for latching the bits of said multi-bit output word;

said plurality of first latching means, said plurality of second latching means and said plurality of output word latching means being controlled by said clock generating means to output the bits supplied thereto simultaneously once each said clock period; and

logic processing means for logically combining bits output by said plurality of first latching means and said plurality of second latching means to produce at least some of said bits of said multi-bit output word, said logic processing means including a plurality of logic means for each performing at least one of a plurality of predetermined logic functions and each having a propagation delay less than said clock period.

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**5,036,484**

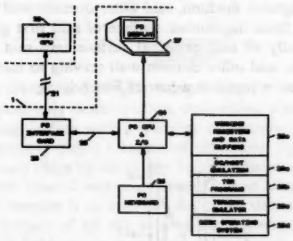
## PERSONAL COMPUTER/HOST EMULATION SYSTEM FOR HANDLING HOST DATA WITH PERSONAL COMPUTER APPLICATION PROGRAMS AT PERSONAL COMPUTERS

**Glenn C. McCoy, Nichols, N.Y., and Eric N. Yiskis, Lompoc, Calif., assignors to International Business Machines Corporation, Amonk, N.Y.**

**Filed Nov. 23, 1988, Ser. No. 275,341**

**Int. Cl.[5] G06F *15/16, 15/18***

**U.S. Cl. 364—900** **16 Claims**



1. In a computing system including a host computer, a personal computer having a display and a keyboard and containing a terminate and stray resident application program which processes data in a first format resident in said personal computer, and a PC/host terminal emulation program means resident in said personal computer and communicating with said host computer which processes data in a second format, said computing system further comprising:

a. screen data conversion means within said personal computer coupled to said PC/host terminal emulation program means for constructing a display screen for said data processed by said host computer in said second format;

b. A keystroke interpretation routine resident within said personal computer for distinguishing between personal computer commands and host computer commands entered from said keyboard;

c. means coupled to said keystroke interpretation routine and responsive to said identified personal computer commands to said terminate and stay resident application program for processing in said first format; and,

d. means coupled to said keystroke interpretation routine for passing host computer commands representing changes to said screen data to said host computer via said PC/host terminal emulation program means for processing in said second format.

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**5,036,485**

## BLOCH-LINE MEMORY DEVICE CAPABLE OF STABLY GENERATING A MAGNETIC DOMAIN

**Yasuharu Hidaka, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Jun. 5, 1990, Ser. No. 533,511**

**Claims priority, application Japan, Jun. 6, 1989, 1-144896**

**Int. Cl.[5] G11C *19/08***

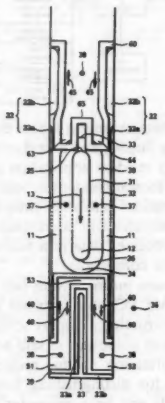
**U.S. Cl. 365—29** **4 Claims**

1. A Bloch-line memory device comprising:

a magnetic medium having a principal surface, an easy axis of magnetization orthogonal to said principal surface, a first groove having a first depth from said principal sur-

face to a bottom surface of said first groove to leave a portion of said principal surface as a plateau with said plateau extended in a predetermined direction, a pair of second grooves extended in said predetermined direction on both sides of said plateau and sharing a second depth which is deeper than said first depth, and a third groove having said second depth and comprising first and second groove portions which are parallel to and orthogonal to said predetermined direction, said plateau having first and second plateau end portions spaced apart in said predetermined direction and a plateau intermediate portion between said first and said second plateau end portions, said second plateau end portion being nearer to said third groove than said first plateau end portion; and

magnetic domain generating means for controllably generating a magnetic domain defined between an inner and an outer domain wall, said inner domain wall surrounding said plateau and extended from the bottom surface of said first groove orthogonally of said principal surface into said magnetic medium, said outer domain wall being extended from the bottom surface of said first groove orthogonally of said principal surface into said magnetic medium, said outer domain wall serving to memorize an information signal as a pair of Bloch lines;



said third groove being spaced apart from said second grooves so that said first groove portion is between said second grooves and does not reach said second plateau end portion;

said magnetic domain generating means comprising:

bias magnetic field generating means for generating a bias magnetic field of a bias intensity in said magnetic medium substantially in a preselected direction which is perpendicular to said principal surface and is directed in a preselected one of a forward sense of from said bottom surface towards said principal surface and a reversed sense which is antiparallel to said forward sense; and

a pair of primary conductors on the bottom surface of said first groove and adjacent to said second plateau end portion and to said second and the third grooves, said primary conductors being supplied with a primary electric pulse current for generating a first local magnetic field between said primary conductors substantially in a reversed direction relative to said preselected direction and a second local magnetic field substantially in said preselected direction on bottom surfaces of said second and said third grooves, each of said first and said second local magnetic fields having a local intensity which is not stronger than said bias intensity.

**5,036,486**

## ASSOCIATIVE MEMORY DEVICE

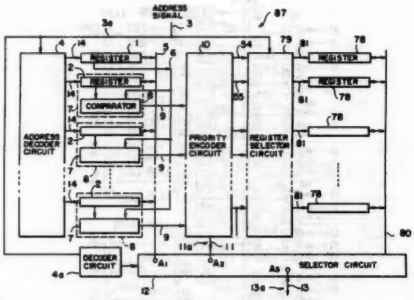
**Kouki Noguchi, Kokubunji; Mitsuru Akizawa, Hachioji, and Kanji Kato, Tokorozawa, all of Japan, assignors to Hitachi, Ltd and Hitachi Maxell, Ltd., both of Tokyo, Japan**

**Filed Jul. 9, 1990, Ser. No. 550,156**

**Claims priority, application Japan, Jul. 31, 1989, 1-196564**

**Int. Cl.[5] G11C *15/04***

**U.S. Cl. 365—49** **4 Claims**




1. An associative memory device comprising:

a first storage element for storing data of a predetermined bit length;

a plurality of second storage elements for storing data of said predetermined bit length;

a first data bus connecting to said first storage element and said plurality of second storage elements so as to read and write said data of said predetermined bit length;

a second data bus transferring said data of said predetermined bit length stored in said first storage element;

a plurality of comparators coupled to said second storage elements and said second data bus for comparing said data of said predetermined bit length stored in said first storage element with said data of said predetermined bit length stored in said plurality of second storage elements;

an output section connected to said plurality of comparators to receive the comparison results outputted from said plurality of comparators; and

a selector section having a first terminal, second terminal and third terminal, said first terminal being connected to said first data bus, said second terminal being connected to an output line of said output section, and said third terminal being connected to a data signal line for inputting and outputting signals of the device, said selector section responsive to a predetermined state of a control signal for allowing a signal transmission between said first terminal and third terminal and inhibiting a signal transmission between said second terminal and third terminal, and responsive to a state of said control signal different from said predetermined state for inhibiting a signal transmission between said first terminal and third terminal and allowing a signal transmission between said second terminal and third terminal.

5,036,487

## CMOS-RAM MEMORY IN A GATE ARRAY ARRANGEMENT

Anastasios Karetsos, Grobenzell, and Gerhard Zwilling, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

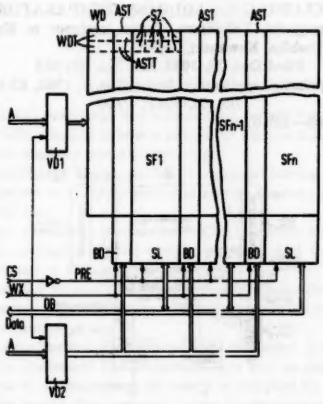
PCT No. PCT/DE88/00195, § 371 Date Nov. 6, 1989, § 102(e) Date Nov. 6, 1989, PCT Pub. No. WO88/09037, PCT Pub. Date Nov. 17, 1988

PCT Filed Mar. 25, 1988, Ser. No. 449,839

Claims priority, application Fed. Rep. of Germany, May 4, 1987, 3714813

Int. Cl.[5] G11C 5/02, 5/06

U.S. Cl. 365—51 6 Claims




1. A CMOS-RAM memory in a gate array arrangement, comprising:

(a) basic cells, each basic cell comprising an operative arrangement of seven transistors;

(b) at least one main memory area comprising a matrix of memory cells arranged in rows and columns, each row containing at least one word selectable by an inverted and non-inverted write signal, each memory cell constructed of an operative arrangement of a basic cell;

(c) a word line adjacent each row and connected to the memory cells of said row;

(d) a drive circuit disposed adjacent to one of said at least one main memory area at one end of the rows thereof, said drive circuit comprising drive sub-circuits, one drive sub-circuit being allocated per row and operative to generate a write signal for its respective row in accordance with a word line signal and a selection signal, each drive sub-circuit comprising at least one basic cell;

(e) a word line decoder disposed adjacent said drive circuit such that said drive circuit is disposed between said one of said at least one main memory area and said word line decoder, said word line decoder comprising a decoder sub-circuit per row of memory cells, each decoder sub-circuit being operative to generate a word line signal from an address signal, said word line signal being supplied to its associated word line;

(f) a block decoder disposed at one columnar end of said drive circuit and operative to generate said selection signal and a read signal from an address signal for said at least one main memory area; and

(g) a read/write circuit disposed adjacent one columnar end of said at least one main memory area and adjacent said block decoder, said read/write circuit being selectable by said read signal and comprised of said basic cells.

5,036,488

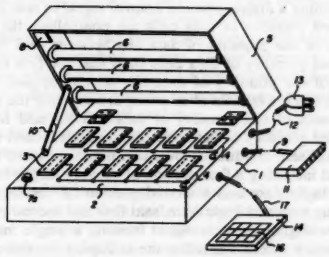
## AUTOMATIC PROGRAMMING AND ERASING DEVICE FOR ELECTRICALLY ERASABLE PROGRAMMABLE READ-ONLY MEMORIES

David Motarjemi, Via Napoli, Deerfield, Fla. 33442

Filed Mar. 24, 1989, Ser. No. 328,549

Int. Cl.[5] G11C 7/00, 13/00

U.S. Cl. 365—52 8 Claims



1. Automatic erasing and programming device for erasable programmable read-only memory chips, comprising: a housing having a working surface with a plurality of receptacles for receiving the memory chips; a source of ultraviolet light for erasing the memory chips by ultraviolet light irradiation; ultraviolet light source control means connected to said ultraviolet light source for turning it on and off; means for determining completion of erasure of all old data in said memory chips connected to said light source control means for turning it off when all of said old data are erased; and programming means for programming said memory chips with new data, being responsive to said erasure determining means for starting programming with said new data when said old data have been erased; wherein said ultraviolet light source is disposed in a cover positionable proximal to said working surface; including automatic lock and release means for locking said memory chips into said receptacles and for releasing said memory chips from said receptacles; wherein said light source control means include a light source start output; and said automatic lock and release means are responsive to said light source start output for locking said receptacles upon start of said light source; and including a push key engageable by said cover connected to said automatic lock and release means for locking said receptacles when said cover is positioned proximal to said working surface and for releasing said receptacles when said cover is positioned apart from said working surface.

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5,036,489

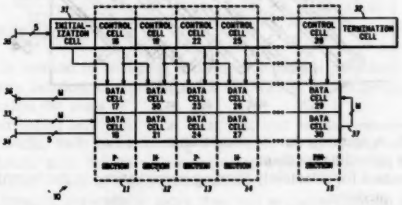
## COMPACT EXPANDABLE FOLDED FIRST-IN-FIRST-OUT QUEUE

Kevin B. Theobald, Cambridge, Mass., assignor to CODEX Corp., Mansfield, Mass.

Filed Apr. 27, 1990, Ser. No. 515,303

Int. Cl.[5] G11C 7/00, 19/00, 19/28

U.S. Cl. 365—73 23 Claims




6. A circuit for storing a plurality of data bits, comprising:

a first plurality of data cells serially coupled between an input bus and a conduction bus for storing the plurality of data bits serially applied at said input bus;

a second plurality of data cells serially coupled between said conduction bus and an output bus and aligned with said first plurality of data cells, said second plurality of data cells being coupled to adjacent ones of said first plurality of data cells for transferring the plurality of data bits between said first and second plurality of data cells; and

a plurality of control cells having a plurality of outputs for providing a digital position control signal to said first and second plurality of data cells for controlling the movement of the plurality of data bits between said first and second plurality of data cells such that the first received one of the plurality of data bits serially applied at said input bus is available at said output bus while the remaining ones of the plurality of data bits fill said first and second plurality of data cells in a predetermined manner toward said conduction bus, said digital position control signal including a first portion of varying length having a first logic state and a second portion of varying length having a second logic state, said first and second portions of the digital position signal forming a single moveable boundary which identifies the occupied portion of said first and second plurality of data cells, wherein a first one of said plurality of control cells comprises,

(a) a first transistor having a gate, a drain and a source, said gate being responsive to a first control signal, said drain being coupled to a first one of said second plurality of data cells, said source being coupled to said a second one of said second plurality of data cells,

(b) a second transistor having a gate, a drain and a source, said drain being coupled to said drain of said first transistor, said source being coupled to a first source of operating potential,

(c) a third transistor having a gate, a drain and a source, said gate being coupled to said drain of said second transistor, said source being coupled to said first source of operating potential, said drain being coupled to said gate of said second transistor,

(d) a fourth transistor having a gate, a drain and a source, said gate being responsive to a second control signal, said drain being coupled to said gate of said second transistor, and

(e) a first inverter having an input coupled to said drain of said fourth transistor and having an output coupled to said source of said first transistor.

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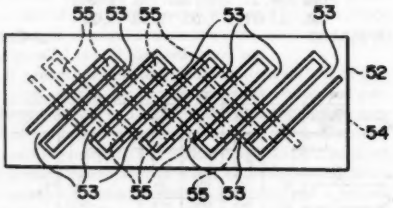
**5,036,490**

## MEMORY DEVICE WITH DUAL CANTILEVER MEANS

**Hiroshi Kajimura, Tokyo, and Takao Okada, Hachiooji, both of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Sep. 28, 1989, Ser. No. 414,128**
**Claims priority, application Japan, Oct. 5, 1988, 63-251575**
**Int. Cl.[5] G11C *11/21***
**U.S. Cl. 365—151** **13 Claims**




1. A memory device comprising:

a recording medium;

means for selectively forming perturbations in the recording medium;

probe means for detecting the presence of the perturbations, the probe means including a conductive probe, means for applying a bias voltage between the probe and the recording medium to permit a tunnel current to flow between the probe and the recording medium, and means for measuring the tunnel circuit;

first movement means, including a first cantilever, for moving the recording medium; and

second movement means, including a second cantilever, for moving the probe, the first and second movement means being so positioned in close proximity to and spaced from each other as to make relative movement.

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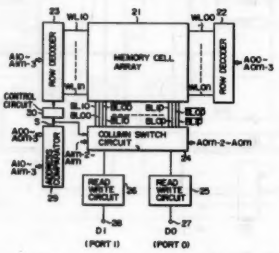
**5,036,491**

## MULTIPORT SEMICONDUCTOR MEMORY INCLUDING AN ADDRESS COMPARATOR

**Akira Yamaguchi, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Dec. 28, 1988, Ser. No. 291,453**
**Claims priority, application Japan, Jan. 7, 1988, 63-1659**
**Int. Cl.[5] G11C *7/00***
**U.S. Cl. 365—189.07** **7 Claims**




1. A semiconductor memory device comprising:

a memory cell array made up of a plurality of memory cells arrayed in a matrix fashion;

two groups of select lines for selecting the memory cells arrayed in rows in the memory cell array;

first and second groups of data line pairs each connected to a plurality of memory cells in said array of memory cells;

first and second row decoders for respectively selecting and driving the select lines in said two select line groups in response to independent row address signals;

an address coincidence detecting circuit for detecting a coincidence of the address signal respectively supplied to said first and second row decoders;

a first control circuit for prohibiting a selected one of said first and second row decoders from performing the select line drive operations when said address coincidence circuit detects a coincidence between the independent row address signals;

first and second data line select circuits supplied with independent column address signals;

a second control circuit controlled by an output signal of said address coincidence detecting circuit for causing said first and second data line select circuits to independently select one data line pair of said first and second groups of data line pairs respectively when a coincidence between said row address signals is not detected and for causing said first and second data line select circuits to select the same data line pair from one of said first and second groups of data line pairs when a coincidence between said row address signals is detected; and

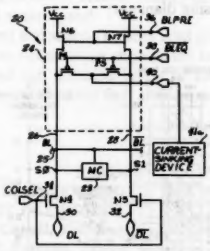
first and second read/write circuits coupled with the data lines respectively selected by said first and second data line select circuits.

5,036,492

## CMOS PRECHARGE AND EQUALIZATION CIRCUIT

Thomas J. Runaldue, San Jose, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Feb. 15, 1990, Ser. No. 480,401
Int. Cl.[5] G11C 7/00
U.S. Cl. 365—203 4 Claims




1. A CMOS precharge and equalization circuit for use with memory cells coupled between paired bit lines in a static random access memory array comprising:

a first precharge N-channel MOS transistor having its drain connected to a supply potential and its source connected to a bit line;

a second precharge N-channel MOS transistor having its drain connected to the supply potential and its source connected to a second bit line;

said first and second precharge transistors have their gates connected together and to a first input node for receiving a true precharge signal;

a first equalization P-channel MOS transistor having its source connected to the first bit line and its drain connected to a common node which is coupled to current-sinking means disposed external to the memory array for sinking current;

a second equalization P-channel MOS transistor having its source connected to the second bit line and its drain connected to the common node; and

said first and second equalization transistors having their gates connected together and to a second input node for receiving a complementary equalization signal.

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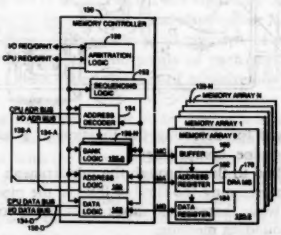
5,036,493

## SYSTEM AND METHOD FOR REDUCING POWER USAGE BY MULTIPLE MEMORY MODULES

Michael J. K. Nielsen, Palo Alto, Calif., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Mar. 15, 1990, Ser. No. 494,672
Int. Cl.[5] G11C 7/00
U.S. Cl. 365—230.03 8 Claims




1. A computer memory system, comprising:

address bus means for transmitting sets of address signals, each set of address signals defining an address in a predefined address space;

data bus means for transmitting sets of data signals;

a plurality of memory module means, coupled to said address bus means and data bus means, each memory module means storing data in a corresponding assigned range of address locations in said predefined address space; wherein each said memory module means comprises one or more memory storage devices distinct from the memory storage devices in other ones of said plurality of memory module means;

decoder means, coupled to said address bus means and said plurality of memory module means, for decoding said sets of address signals and generating a memory module enable signal corresponding to one of said memory module means whenever said set of address signals define an address in one of said address ranges assigned to said plurality of memory module means;

sequencing means for generating memory control signals for accessing data stored in said plurality of memory module means; and

a plurality of logic and register means, each logic and register means coupled to said address bus means, data bus means, decoder means, sequencing means and a corresponding one of said memory module means, for transmitting said memory control signals from said sequencing means, address signals from said address bus means and data signals from said data bus means to said corresponding memory module means only when said decoder means generates a memory module enable signal for said corresponding memory module means; wherein said register means comprises CMOS circuits which dissipate only leakage current when not enabled by a memory module enable signal;

whereby control, address and data signals are not transmitted to any of said plurality of memory module means for which a memory module enable signal has not been generated.

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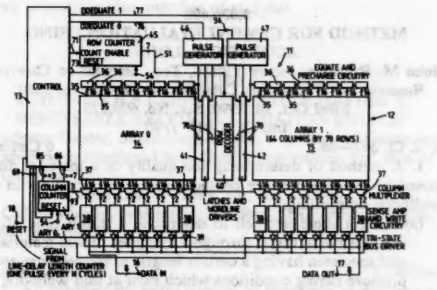
5,036,494

## MEMORY ACCESSING

Adrian P. Wise, and Richard M. Forsyth, both of Bristol, England, assignors to Inmos Limited, Bristol, England

Filed Mar. 16, 1990, Ser. No. 494,681
Claims priority, application United Kingdom, Mar. 20, 1989, 8906354
Int. Cl.[5] G11C 7/00, 8/00
U.S. Cl. 365—230.03 28 Claims




1. A method of accessing a memory having a plurality of memory locations comprising static RAM cells, which method comprises the steps of:

distributing said cells in at least first and second memory blocks, each block having a plurality of rows and columns, each cell being connected to a pair of bit lines to transfer data to and from each cell;

addressing sequentially more than one memory location in said first memory block and effecting a data transfer for

each memory location addressed, and at the same time effecting an equate operation on bit lines in said second memory block; and

after addressing memory locations in said first memory block, switching said addressing and equate operations so as to address sequentially more than one memory location in said second memory block and effecting a data transfer for each memory location addressed and at the same time equating bit lines in said first memory block.

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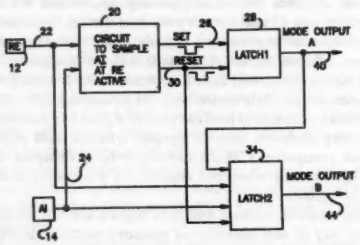
**5,036,495**

**MULTIPLE MODE-SET FOR IC CHIP**

**Robert E. Busch, Colchester, Vt.; William P. Hovis, Rochester, Minn.; Theodore M. Redman, Milton, Vt.; Endre P. Thoma, Colchester, Vt., and James A. Yankosky, Essex Junction, Vt., assignors to International Business Machines Corp., Armonk, N.Y.**

**Filed Dec. 28, 1989, Ser. No. 469,880**
**Int. Cl.[5] G11C *8/00***
**U.S. Cl. 365—233** **8 Claims**




1. A method for setting various operating modes of a memory device comprising the steps of: monitoring the voltage state at a first input to the memory device when an enable signal has been received and held active at a second input to the memory device; operating the memory device in a first operating mode if the voltage state of the first input is at a first value; operating a memory device in a second operating mode different from said first operating mode if the voltage state of the first input is at a second value different from the first value; and operating the memory in a third operating mode different from said first and second operating modes if the voltage state of the first input changes while the enable signal is received and held active at the second input.

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**5,036,496**

**METHOD FOR CEMENT EVALUATION USING ACOUSTICAL LOGS**

**John M. Rutledge, Jersey Village, Tex., assignor to Chevron Research and Technology Company, San Francisco, Calif.**

**Filed Oct. 18, 1990, Ser. No. 600,373**
**Int. Cl.[5] G01V *1/40***
**U.S. Cl. 367—35** **6 Claims**

1. A method of determining the quality of a material disposed in an annular space behind a casing and/or liner in a wellbore, comprising:

(a) using a sonic test cell to determine a transit time of a sound wave to travel through a specimen of said material, said specimen having a certain length, at temperature and pressure curing conditions which exist at said wellbore;

(b) determining a pulse velocity by dividing said length of said specimen by said transit time;

(c) determining a slurry density of said material;

(d) recording a mixing rate at said wellbore;

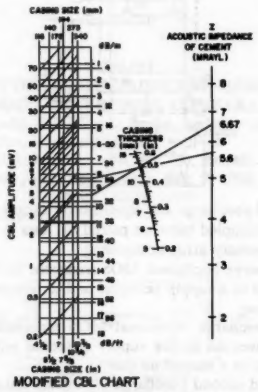
(e) determining a volume of said slurry by multiplying the amount of time that said slurry remains at said slurry density by said mixing rate, said slurry volume having a theoretical acoustical impedance that is equal to said slurry density multiplied by said pulse velocity;

(f) determining a true annular displacement volume in said wellbore;

(g) determining a theoretical acoustical impedance map of said annular space behind said casing;

(h) comparing a known casing and/or liner thickness at various locations within said wellbore to said theoretical acoustical impedance, to determine an attenuation rate map at said various locations;

(i) determining a voltage map, by comparing said attenuation rate to the casing diameter;




(j) running an acoustical log across said locations within said wellbore;

(k) comparing said theoretical acoustical impedance map, said casing and/or liner thickness and said attenuation rate map to said voltage map to determine a calculated acoustical impedance of said material disposed behind said casing and/or liner; and

(l) comparing said calculated acoustical impedance with said theoretical acoustical impedance, to predict said quality of said material.

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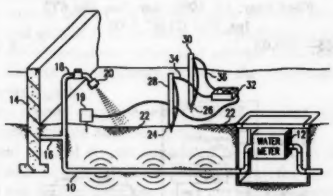
**5,036,497**

**METHOD AND APPARATUS FOR DETECTING LOCATION OF A SUBTERRANEAN PIPE**

**Lynn B. Heitman, 4711 Sycamore La., Parker, Tex. 75002**

**Filed Jul. 27, 1990, Ser. No. 558,824**
**Int. Cl.[5] G01S *3/80*; G01H *17/00***
**U.S. Cl. 367—120** **20 Claims**




1. A method for detecting the location of a subterranean fluid carrying pipe, comprising:

allowing fluid to flow through the subterranean pipe;

abruptly interrupting the flow of fluid in the pipe to impart a shock wave thereto, the shock wave being conducted to the surrounding medium;

disposing first and second seismic sensors in the ground in the general location of the pipe, the first and second sensors operable to sense the seismic energy of the seismic wave imparted to the surrounding medium from the pipe,

the seismic wave resulting from the shock wave conducted through the surrounding medium from the pipe;

spacing the first and second seismic sensors a finite distance apart, the first and second sensors operable to sense the seismic energy of the seismic wave imparted to the surrounding medium from the pipe;

detecting the seismic energy received at each of the first and second sensors;

comparing the detected seismic energy detected at the first and second sensors; and

moving the first and second sensors until the first and second sensors are in a plane at an angle to the longitudinal axis of the pipe and the detected levels of seismic energy are substantially equal at the first and second sensors.

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**5,036,498**

**METHOD FOR DETERMINING THE MOTION OF A TARGET IN UNDERWATER ACOUSTICS**

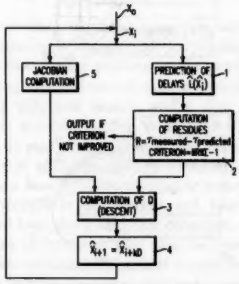
**Dominique Van Cappel, Villeneuve Loubet, France, assignor to Thomson-CSF, Puteaux, France**

**Filed May 18, 1990, Ser. No. 524,804**

**Claims priority, application France, May 22, 1989, 89 06662**

**Int. Cl.[5] G01S *3/80***

**U.S. Cl. 367—125** **4 Claims**




1. A method for determining the motion of a target in underwater acoustics by means of an antenna with misaligned sensors ($C_1$, $C_2^P$, $C_3$) provided with a central sensor $C_2^P$, comprising the steps of:

estimating the characteristics of velocity ($V_x$, $V_y$) and position of the target X ($t^*$), Y ($t^*$) relative to the antenna by means of a motion estimator;

applying a GAUSS NEWTON iterative algorithm taking into account the differences in propagation times measured between fronts transmitted by the target and reaching the sensors, said method further comprising the steps of;

initializing the GAUSS NEWTON algorithm of the motion estimator by means of an initial state vector X determined on the basis of the values of azimuths AKI of the target perceived from the mid-points of each pair of sensors, during a determined number of measurements staggered in time; and

estimating the state vector X by taking into account the value of the elevation of the target with respect to the antenna, with the horizontal coordinates of the position of the target and its velocity vectors being determined for initializing the GAUSS NEWTON algorithm by resolving a system of equations determined for each sensor pair by the matrix relationship;

$$(\cos A_{k1} - \sin A_{k1}\,(t - t^*)\cos A_{k1} - (t - t^*)\sin A_{K1}) =$$

-continued

$$I_{kx}\cos A_{k1} - I_{kiy}\sin A_{k1}\cdot \begin{pmatrix} x(t^*) \\ y(t^*) \\ V_x \\ V_y \end{pmatrix}$$

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**5,036,499**

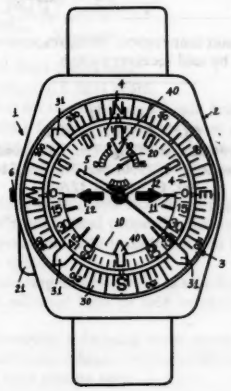
**WATCH FOR SAILING RACES**

**Damiano Alberti, Bovisio, Italy, assignor to Artime S.P.A., Naples, Italy**

**Filed Nov. 20, 1990, Ser. No. 616,776**

**Int. Cl.[5] G04B *47/00, 19/00***

**U.S. Cl. 368—10** **5 Claims**



1. A watch for sailing races including a watch body having a casing with a dial provided with marks for indicating the hours and minutes, and pointer members, characterized in that said watch further comprises an inclinometer comprising a sector at least partially overlaying said dial and provided with arrows for indicating an inclination angle, said arrows being adapted to be registered with registering marks arranged on a front protecting glass member of said dial.

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**5,036,500**

**AUTONOMOUS RADIO TIME PIECE HAVING A RESETTABLE RECEIVER ACTUATION SWITCH**

**Wolfgang Ganter, Schramberg-Sulgen, Fed. Rep. of Germany, assignor to Junghans Uhren GmbH, Schramberg, Fed. Rep. of Germany**

**Filed Dec. 19, 1989, Ser. No. 452,336**

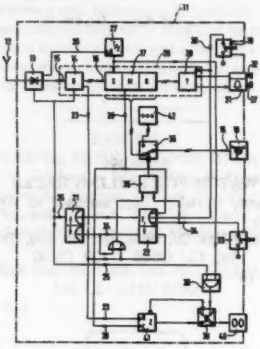
**Claims priority, application Fed. Rep. of Germany, Dec. 20, 1988, 8815765**

**Int. Cl.[5] G04C *11/02***

**U.S. Cl. 368—47** **9 Claims**

1. An autonomous radio controlled timepiece comprising a receiver, a processor means connected to said receiver including a time register for storing an actual time value, a decoder connected to said time register, a receiver switch operably connected to said receiver for temporarily actuating said receiver without resetting said time register, a time display unit connected to said time register, means for setting a maximum receiver actuation period connected to said receiver switch, and means for temporarily setting said time display unit to a

reference position and for returning, following termination of the maximum receiver actuation period, to the actual time



value stored in said time register being responsive to actuation of said receiver by said receiver switch.

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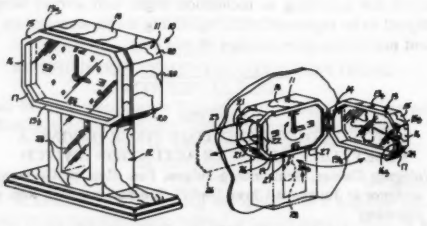
**5,036,501**
**CLOCK ASSEMBLY**
**Magel Smith, 4104 Laurel Village Dr., Richmond, Va. 23228**
**Filed Aug. 8, 1990, Ser. No. 564,114**
**Int. Cl.[5] G04B *37/00***
**U.S. Cl. 368—88** **6 Claims**



1. A clock assembly comprising,
a polygonal clock head including a top panel overlying and spaced from a bottom panel, and
at least one first end panel spaced from at least one opposed second end panel to define an enclosure, and
said clock head further including a replaceably mounted clock face within said clock head, and
a polygonal pivoted cover with a perimeter configuration equal to that defined by the clock head, and
a pedestal assembly removably mounted to the bottom panel of the clock head, and
wherein the pivoted cover includes a first end wall including a hinge wherein the hinge is mounted to the first end panel of the clock head, and the first end wall is spaced from a second end wall, and the second end wall is of a second width greater than a first width defined by the first end wall, and the second end panel includes a forwardly oriented recess to receive the second end wall therein, and wherein the second end panel is of a width less than the first end panel to define said recess, and
wherein the clock face is slidably mounted within a forward groove formed within the top panel, first end panel, and the second end panel of the clock head.

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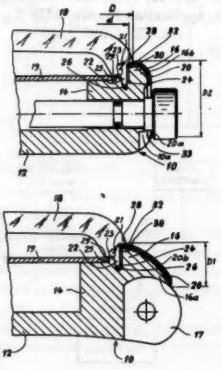
**5,036,502**
**CAPPED WATCH CASE**
**Laurent Grosjean, Neuchatel, Switzerland, assignor to ETA SA Fabriques d'Ebauches, Switzerland**
**Filed Mar. 22, 1989, Ser. No. 327,053**
**Claims priority, application Switzerland, Mar. 23, 1988, 01096/88**
**Int. Cl.[5] G04B *7/00***
**U.S. Cl. 368—286** **8 Claims**



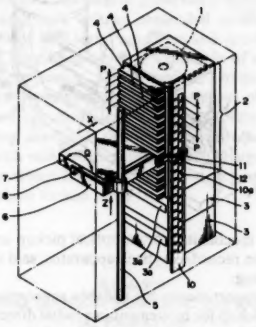
1. A watch case comprising:
a caseband-bezel unit (**10**) having a caseband and a bezel (**16**) integral with said caseband;
a glass (**18**) secured to said caseband;
outwardly extending lugs (**17**) for securing a wristlet to said watch case, said lugs being integrally formed with said caseband and defining between them a space for attaching the wristlet to opposite ends of said caseband, said caseband further comprising cover wall portions (**16*a***) also integrally formed with said case and covering said space between said lugs (**17**) on each of said opposite ends of said caseband, and extending outwardly from the opposite ends of said caseband-bezel unit (**10**); and
metal cap means (**20**) matching the shape of said bezel (**16**), said caseband and said cover wall portions (**16*a***); said cap means (**20**) having side portions (**20*a***) and end portions (**20*b***) respectively overlaying side walls (**10*a***) of said caseband and said cover wall portions (**16*a***), said end portions (**20*b***) extending outwardly and downwardly over a vertical distance (D1) allowing the wristlet to be attached to said lugs (**17**), said distance (D1) being less than a vertical distance (D2) over which said side portions (**20*a***) extend outwardly and downwardly over said side walls (**10*a***) of said caseband; and wherein
said cap means (**20**) has a top opening, and said glass (**18**) comprises a heel (**28**) extending radially towards the periphery of said case and defining with said bezel (**16**) a groove (**30**) in which an edge portion (**32**) of said top opening of said cap means (**20**) is held.

## 5,036,503

## DISC RECORDING AND/OR PLAYBACK APPARATUS WITH AUTOMATIC CHANGER

Toshihiko Tomita, Tokorozawa, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed May 23, 1988, Ser. No. 197,273
Claims priority, application Japan, Aug. 21, 1987, 62-207990
Int. Cl.[5] G11B *17/22, 15/68*
U.S. Cl. 369—36 12 Claims



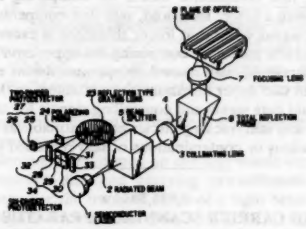
1. A disc recording/playback apparatus with an automatic changer, comprising a storage unit for storing a plurality of discs each at a disc storage position in said storage unit, each of said discs having first and second sides containing information, disc recording/playback means, and a disc withdraw/feed mechanism for selecting a disc from said storage unit and feeding a disc to said storage unit or said recording/playback means, said disc withdraw/feed mechanism having a base movable along a first direction parallel to a direction in which the discs are arrayed in said storage unit, base driving means for driving said base along said first direction, disc retrieving-/rotating means mounted on said base for movement along a second direction substantially normal to said first direction for retrieving and holding a selected disc and rotatable about 180° between first and second positions for rotating said selected disc to feed said selected disc to said disc recording/playback means for accessing said first side or said second side of said selected disc, respectively, and position detecting means for detecting that said base has been moved to a position where the selected disc can be retrieved by said disc retrieving/rotating means, said position detecting means comprising a positioning indicia group having positioning indicia arranged along said first direction in which said base is movable and aligned respectively with said disc storage positions in said storage unit, an absolute address code group disposed parallel to said positioning indicia group and including a plurality of address code patterns respectively indicating addresses of said positioning indicia, reading means mounted for movement with said base for reading said absolute address code group, and first and second detection means, said reading means and said first detection means detecting said absolute address code group and said positioning indicia group, respectively, when said disc retrieving/rotating means is in said first position, and said reading means and said second detection means detecting said absolute address code group and said positioning indicia group, respectively, when said disc retrieving/rotating means is in said second position for maintaining said disc retrieving/rotating means in said first and second positions thereof in proper alignment with each of said disc storage positions when said base is moved to each of said disc storage positions for retrieving or replacing a disc and with said disc recording/playback means when said base is moved to said disc recording/-playback means.

## 5,036,504

## OPTICAL HEAD USING A REFLECTION GRATING

Yuzo Ono; Akitomo Ohba, and Yasuo Kimura, all of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Nov. 30, 1988, Ser. No. 277,735
Claims priority, application Japan, Nov. 30, 1987, 62-303529; Jun. 29, 1988, 63-164024
Int. Cl.[5] G11B *7/00*
U.S. Cl. 369—44.12 7 Claims



1. An optical head comprising;
means for radiating a light beam;
a beam splitter for transmitting said light beam therethrough and reflecting light beam reflected from a disk;
a focusing lens for focusing said light beam on said disk and transmitting light beam reflected from said disk therethrough;
a reflection type grating lens including a plurality of regions having different optical properties for diffracting mainly specified polarized light included in said light beam from said beam splitter;
means for detecting a signal stored in said disk in accordance with said reflected light of said reflection type grating lens; and
means for detecting a focusing error signal and a tracking error signal in accordance with said diffracted light of said reflection type grating lens.

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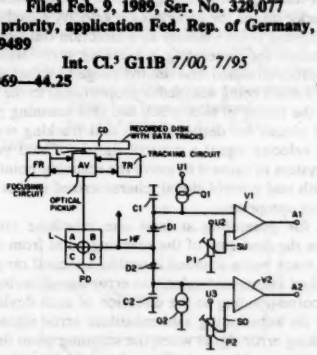
## 5,036,505

## DATA REPRODUCTION ARRANGEMENT FOR RECALLING DATA READABLE WITH AN OPTICAL PICKUP FROM A RECORDED MEDIUM

Günter Gleim, Villingen-Schwenningen, Fed. Rep. of Germany, assignor to Deutsche Thomson-Brandt GmbH, Villingen, Fed. Rep. of Germany

Filed Feb. 9, 1989, Ser. No. 328,077
Claims priority, application Fed. Rep. of Germany, Jun. 11, 1987, 3719489
Int. Cl.[5] G11B *7/00, 7/95*
U.S. Cl. 369—44.25 3 Claims



3. A data reproduction arrangement for recalling data that can be read out with an optical pickup from data storage tracks of a recorded medium, comprising: a recorded medium, with data storage tracks; a focusing circuit for focusing a beam of light on said recorded medium; a tracking circuit for advanc-

ing said beam along said data storage tracks; a photodector for receiving said beam of light reflected from said recorded medium and for generating a direct-current coupled electrical data signal having upper and lower envelopes; and means for processing said data signal and said upper and lower envelopes of said data signal only to obtain a criterion for controlling optimum amplification of said tracking circuit and said focusing circuit in reproducing the data on said recorded medium under vibrations and contaminations of said recorded medium; means for clamping said data signal to said upper and lower envelopes; first comparator means for comparing the lower envelope with a lower threshold, said first comparator means emitting a signal when said lower threshold is exceeded; second comparator means for comparing the upper envelope with an upper threshold, said second comparator means emitting a signal when said upper threshold is not attained, so that disturbance in said data signal and controlling signals for said focusing circuit and said tracking circuit are identifiable as to arising from vibrations or contaminations of said recorded medium.

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**5,036,506**

## RECORD CARRIER SCANNING APPARATUS WITH FEEDBACK CONTROL SYSTEM FOR CONTROLLING SCANNING POINT POSITION AND VELOCITY

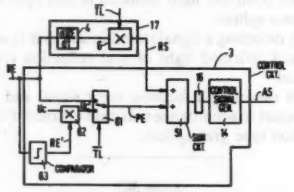
**Martinus P. M. Bierhoff, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Feb. 27, 1989, Ser. No. 316,396**

**Claims priority, application Netherlands, Oct. 5, 1988, 8802435**

**Int. Cl.[5] G11B *7/095***

**U.S. Cl. 369—44.28** **8 Claims**



1. Apparatus for scanning a record carrier having substantially parallel recording tracks, such apparatus including a position control system having a feedback loop for controlling the position and velocity of a scanning point so as to follow said tracks, said position control system comprising: actuating means for moving the scanning point in a direction transverse to the tracks; means for generating a velocity signal indicative of the scanning point velocity in a direction transverse to the tracks; means for generating a tracking error signal which within a predetermined first limited range to either side of the center of a track being scanned is proportional to the deviation between the center of such track and said scanning point; and a control circuit for deriving from said tracking error signal and said velocity signal a control signal for said positioning control system to cause it to move the scanning point in accordance with said control signal; characterized in that said control circuit comprises:

means for generating at least one substitute error signal when the deviation of the scanning point from the center of a track being scanned is within a second range outside the first range, said substitute error signal having a polarity corresponding to the direction of such deviation; and

means for substituting said substitute error signal for said tracking error signal when the scanning point deviation is in said second range, so that when said deviation is in said second range said control signal controls movement of said scanning point in accordance with said velocity signal and said substitute error signal, said velocity signal being independent of whether the scanning point deviation is in said first range or said second range.

**5,036,507**

## TILTING MECHANISM FOR OPTICAL PICKUP UNIT

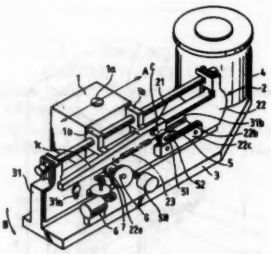
**Masakazu Yamashita, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan**

**Filed Nov. 1, 1989, Ser. No. 430,536**

**Claims priority, application Japan, Mar. 9, 1989, 1-26125[U]**

**Int. Cl.[5] G11B *7/00, 21/00***

**U.S. Cl. 369—44.32** **5 Claims**



1. A tilting mechanism for an optical pickup unit of an optical information record/playback apparatus, said tilting mechanism comprising:

a pickup support means for slidably supporting thereon an optical pickup for movement in a radial direction of a disk;

a movable fulcrum which is movable relative to said pickup support means in a direction parallel to the direction of the sliding of said optical pickup on said pickup support means; and

means for moving said movable fulcrum to a preset position depending on the position of said optical pickup on said pickup support means, said optical pickup and said pickup support means being tilted about said fulcrum with respect to the disk.

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**5,036,508**

## SPINDLE SERVO UNIT FOR DISK PLAYING DEVICE

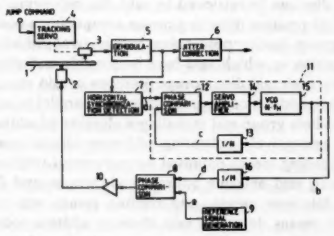
**Takashi Okano, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan**

**Filed Dec. 21, 1988, Ser. No. 287,237**

**Claims priority, application Japan, Feb. 19, 1988, 63-37045**

**Int. Cl.[5] G11B *17/00***

**U.S. Cl. 369—50** **7 Claims**



1. A spindle servo unit for a disk playing device having rotational driving means for rotating a recording disk in accordance with a driving signal, and information reproducing and processing means for reproducing and processing an information signal which is recorded in a recording disk, said disk playing device being responsive to a track jumping command for causing a pickup of said disk playing device to move more than one track along a surface of said recording disk, said spindle servo unit comprising:

synchronization detecting means for detecting a synchronizing signal in said information signal;

signal generating means for generating an output signal which is synchronized with the detected synchronizing signal;

first frequency dividing means for frequency-dividing the frequency of the output signal from said signal generating means to provide a first frequency-divided signal; and

error signal generating means for generating an error signal corresponding to a phase difference between the frequency-divided signal and a reference signal,

wherein said error signal is said driving signal, and wherein an amount of discontinuity in control of said spindle servo unit is reduced, said signal generating means comprises a servo amplifier, a voltage controlled oscillator receiving an output of said servo amplifier and providing a signal having a frequency which is a multiple of a frequency of said synchronizing signal, second frequency-dividing means for frequency-dividing an output of said voltage controlled oscillator, and phase comparison means for comparing an output of said second frequency-dividing means with said detected synchronizing signal to provide an output which is supplied to said servo amplifier so as to form a phase locked loop.

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**5,036,509**

## GUIDE MECHANISM FOR DISC REPRODUCING APPARATUS

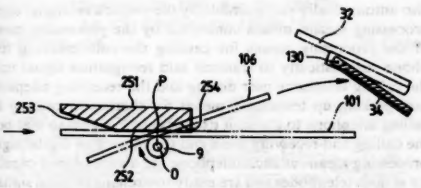
**Kazuo Kobayashi; Yoshinori Yamada; Kiyoshi Morikawa; Masakazu Kurumada, and Masanori Sugihara, all of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan**

**Filed Mar. 13, 1990, Ser. No. 492,199**

**Claims priority, application Japan, Mar. 13, 1989, 1-60540; Mar. 13, 1989, 1-60541**

**Int. Cl.[5] G11B** *33/02, 5/016, 17/04*

**U.S. Cl. 369—75.2** **3 Claims**




2. A disc reproducing apparatus in which a disc is inserted through a disc insertion opening to abut a drive roller and is then delivered by means of the drive roller to a clamp position of a player, a clamper arm extending over the turntable to fix the disc on the turntable, and the turntable is rotated to reproduce information recorded in the disc, said apparatus comprising:

a disc guide plate for guiding a small-diameter disc to the clamp position on the turntable being pivotally mounted on the underside of the clamper arm;

a guide member being opposed to said drive roller, the guide member cooperating with said drive roller to guide and deliver the disc;

a parallel guide surface being formed on said guide member, said surface being substantially parallel to the disc delivery direction; and

an inclined groove being formed continuously integral with the parallel guide surface, said inclined groove having a length through which said small-diameter disc can pass in a disc insertion direction but through which a large-diameter disc cannot pass, said inclined groove orienting said small-diameter disc to said disc guide plate.

**5,036,510**

## OPTICAL RECORDING DISK

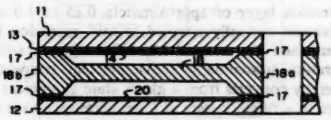
**Ryutaro Hayashi; Toshikazu Yoshino, and Yukio Kimura, all of Tokorozawa, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan**

**Filed May 26, 1988, Ser. No. 199,203**

**Claims priority, application Japan, Jul. 8, 1987, 62-104962[U]**

**Int. Cl.[5] G11B** *3/70, 5/84*

**U.S. Cl. 369—283** **6 Claims**




1. A single side optical recording disk comprising:

a transparent disk;

a transferring layer formed on one side whole surface of the transparent disk and carrying pre-addresses and pre-grooves for the tracking servo of a light beam projected through the transparent disk;

a recording layer formed on a surface of said transferring layer;

a protection disk;

a dummy layer formed on one side whole surface of said protection disk;

annular spacers being sandwiched by an adhesive layer between said transferring layer and said dummy layer so as to maintain a cavity between the transparent disk and the protection disk;

said recording layer and said dummy layer facing inward to said cavity;

said protection disk and said transparent disk being of the same material and thickness, and said dummy layer and said transferring layer being of the same material and thickness;

a mirror surface layer formed on a surface of said dummy layer facing inward to said cavity; and

a reinforcement disk formed integrally with the outer spacers and extending through a central portion of said cavity midway between said transparent disk and said protection disk.

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**5,036,511**

## RECORDING METHOD AND APPARATUS

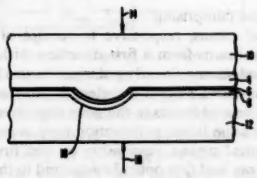
**Paul R. Goldberg, Palo Alto; Bryan K. Clark, Sunnyvale; Joel D. Finegan, Campbell, and Robert Guerra, Santa Clara, all of Calif., assignors to Tandy Corporation, Ft. Worth, Tex.**

**Division of Ser. No. 294,723, Jan. 10, 1989, which is a continuation-in-part of Ser. No. 153,288, Feb. 5, 1988, abandoned. This application Apr. 16, 1990, Ser. No. 510,360**

**The portion of the term of this patent subsequent to Jul. 25, 2006, has been disclaimed.**

**Int. Cl.[5] G11B** *11/03, 7/26*

**U.S. Cl. 369—284** **28 Claims**



1. A storage medium mounted on a rigid substrate in which optical data can be recorded through said substrate by a record light beam and from which data so recorded can be read by a

read light beam reflected back through said substrate into a detection system designed to read signals reflected through a layer which is substantially the optical equivalent of said rigid substrate, said storage medium comprising:

an expansion layer of approximately 0.5 to 1.5 microns in thickness optically coupled to said substrate along an interface therebetween and expandable upon heating to a temperature substantially above ambient temperature to form protrusions in the surface thereof opposite said interface;

a retention layer of approximately 0.25 to 1.0 micron in thickness optically coupled to said expansion layer and comprised of a material which has a glass transition temperature substantially above ambient temperature and thereby converts from a glassy state at ambient temperature to a rubbery state at a temperature above said glass transition temperature;

a reflective layer coupled to said retention layer and which reflects at least about 85% of the light from said read light beam passing through said expansion and retention layers back through said expansion and retention layers and said substrate, and is sufficiently elastic to conform substantially to the contour of said retention layer; and

a protective layer on the side thereof toward which said protrusions extend, said protective layer being of material sufficiently deformable to receive said protrusions; the thicknesses of said expansion layer and said retention layer each being about 1/1000th or less of the thicknesses of said substrate and said protective layer, and said retention layer having a thickness of about 1.0 micron or less.

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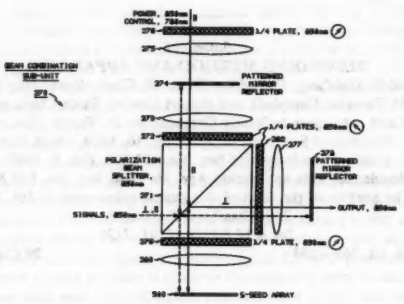
**5,036,512**

## OPTICAL APPARATUS FOR COMBINING LIGHT BEAM ARRAYS HAVING DIFFERENT WAVELENGTHS

**Thomas J. Cloonan, Downers Grove, Ill.; Jack L. Jewell, Bridgewater, N.J.; Frederick B. McCormick, Jr., Lisle, Ill.; David A. B. Miller, Fairhaven, and Michael E. Prise, Atlantic Highlands, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

Filed May 8, 1989, Ser. No. 349,275
Int. Cl.[5] H04J *14/06, 14/02*
U.S. Cl. 370—2 17 Claims




1. Apparatus comprising

first optical means, responsive to receipt of first linearly polarized beams from a first direction with a first wavelength and second linearly polarized beams from a second direction with a second wavelength, for transmitting said first and second beams in the same direction as each other with the same linear polarization type as each other and

second optical means, responsive to said first and second beams from said first optical means and to third beams and fourth beams received in a direction other than said same direction, said third and fourth beams all having said first wavelength but said third beams having a different linear polarization type than said fourth beams, for transmitting said first, second, third and fourth beams all in the same direction.

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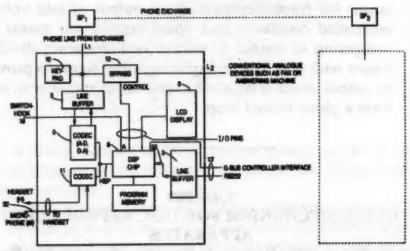
**5,036,513**

## METHOD OF AND APPARATUS FOR INTEGRATED VOICE (AUDIO) COMMUNICATION SIMULTANEOUSLY WITH "UNDER VOICE" USER-TRANSPARENT DIGITAL DATA BETWEEN TELEPHONE INSTRUMENTS

**Richard D. Greenblatt, Cambridge, Mass., assignor to Academy of Applied Science, Concord, N.H.**

Filed Jun. 21, 1989, Ser. No. 369,704
Int. Cl.[5] H04M *11/06*
U.S. Cl. 370—125 16 Claims



7. Apparatus for combining voice communication simultaneously with digital alpha-numeric data transmission and reception between a pair of telephones connected with a telephone exchange having, in combination, cooperative digital signal processing means and alpha-numeric display means provided at each telephone; means for generating a distinctive recognition signal at each telephone indicative of the existence of said digital processing and display capability and comprising a distinctive time-varying audio signal within the frequency band of the audio communication and audible to the users and also automatically recognizable by the respective digital signal processing means; means controlled by the processing means of the processing means for causing the call-receiving telephone automatically to transmit said recognition signal upon the calling telephone user dialing and the receiving telephone user picking up telephone; means for thereupon causing the calling telephone to transmit its recognition signal so that both the calling and receiving users and the respective digital signal processing means at each telephone are aware of said capability at both telephones and are ready to exchange digital signals; and means controlled by the digital signal processing means for causing the exchange of digital signal data between the pair of telephones simultaneously with the voice communication and imperceptible to the telephone users and without interference with the voice communication.

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**5,036,514**

## APPARATUS AND METHOD FOR ISOLATING AND PREDICTING ERRORS IN A LOCAL AREA NETWORK

**Robert W. Downes, Raleigh; Wilson E. Smith, Bahama; Ronald E. Suciu, and Kenneth T. Wilson, both of Raleigh, all of N.C., assignors to International Business Machines Corp., Armonk, N.Y.**

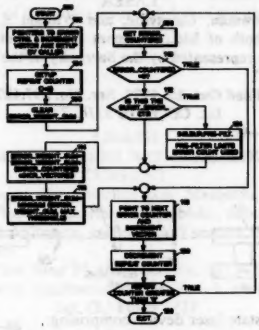
Filed Nov. 9, 1989, Ser. No. 433,930
Int. Cl.[5] H04L *12/26;* H04J *3/14;* G06F *11/34*
U.S. Cl. 371—51 7 Claims

5. In a communication network including a plurality of data terminals, each of which detects one or more error conditions, at least one of which can result from more than one cause, and reports the identity and number of the detected errors to at least one error monitor station which accumulates weighted error counts for at least some of the reporting stations, a method of adjusting the weighted errors as a function of a

cause of the at least one error having more than one cause comprising the steps at the error station of:

examining each of the received error reports during a time period to determine if it includes error counts which can resuslt from more than one cause and pre-filtering the error count related thereto;

weighting and summing the pre-filtered and unfiltered errors;



counting the number of stations reporting an error which can result from more than one cause; and

at the expiration of the said time period, filtering the weighted errors of the reporting stations when the count of stations reporting an error which can result from more than one cause exceeds a predetermined value.

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**5,036,515**

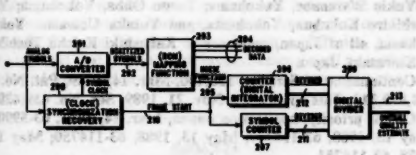
**BIT ERROR RATE DETECTION**

**Thomas A. Freeburg, Arlington Heights, Ill., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed May 30, 1989, Ser. No. 358,773**

**Int. Cl.[5] G06F *11/00*; H04B *17/00***

**U.S. Cl. 371—5.5** **20 Claims**



1. A method of error detection comprising:

digitizing a received signal,

detecting that received signal,

more narrowly detecting that received signal, and

accumulating bit errors from detections outside the narrow detection, but otherwise detected.

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**5,036,516**

**PROCESS AND MEANS FOR SELFTEST OF RAMS IN AN ELECTRONIC DEVICE**

**Steve Cordell, 3317 Cardiff Ave., Los Angeles, Calif. 90034**

**Filed Feb. 13, 1989, Ser. No. 309,138**

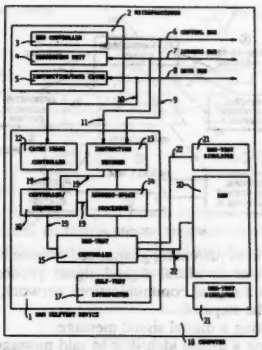
**Claims priority, application Fed. Rep. of Germany, Feb. 20, 1988, 3805391**

**Int. Cl.[5] G01F *11/00***

**U.S. Cl. 371—16.1** **16 Claims**

1. A method for executing a selftest of a Random Access Memory (RAM) in an electronic device, testing at the maximum speed of the RAM, especially in a device such as a computer whose central processing unit and arithmetic logic unit are dependent on a stored program, comprising the steps of:

choosing cells or cell groups of said RAM for testing, said choice depending on the current program instruction not accessing said cell or cell groups, as well as by using the instruction and address information of instructions whose future execution and RAM processing can reasonably be predicted, and



performing the selftest by using said prediction to select for self-testing those cells or cell groups which will not be accessed by the central processing unit or any of its peripheral devices while said selftest on said cells or cell groups is in progress.

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**5,036,517**

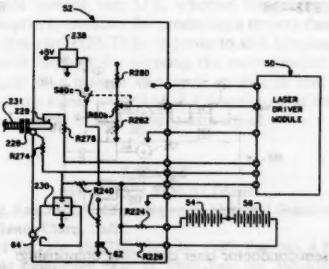
**TARGET ILLUMINATORS AND SYSTEMS EMPLOYING SAME**

**Brad E. Meyers, c/o B.E. Meyers Co., Inc., 17525 N.E. 67th Ct., Redmond, Wash. 98052**

**Division of Ser. No. 489,280, Mar. 2, 1990, Pat. No. 4,991,183. This application Oct. 1, 1990, Ser. No. 590,937**

**Int. Cl.[5] H01S *3/13***

**U.S. Cl. 372—29** **9 Claims**



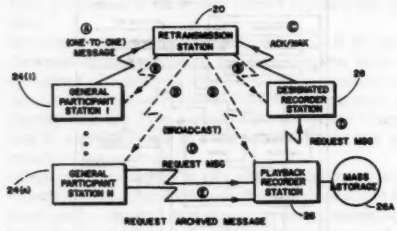
1. A device for illuminating a target or a selected part thereof, said device comprising: a casing; a diode-type laser for generating a beam of coherent energy, said laser being housed in said casing; an optical lens in said casing on the output side of said laser for projecting the beam of coherent energy; and means in said casing for operating said laser, said laser having a standby mode and said laser operating means including means for causing a threshold current to flow through the laser when said laser is in the standby mode, thereby keeping the laser from operating erratically when it is subsequently turned on.

5,036,518

## GUARANTEED RELIABLE BROADCAST NETWORK

Lawrence C. N. Tseung, 9 Silver Hill Rd., Acton, Mass. 01720

Filed Nov. 2, 1988, Ser. No. 266,473
Int. Cl.[5] H04L 1/22; G08C 25/04
U.S. Cl. 371—32 64 Claims




1. A method of providing guaranteed reliable broadcast data communications to plural digital signal processing stations connected to a digital communications network, said method comprising the steps of:

(a) originating a digital signal message;

(b) assigning a global identifier to said message;

(c) broadcasting said message together with said assigned global identifier over said communications network;

(d) receiving and acknowledging said broadcasted message with a designated recorder station; and

(e) receiving said broadcasted message correctly with substantially 100% reliability at each of said plural stations without requiring acknowledgements from said plural stations.

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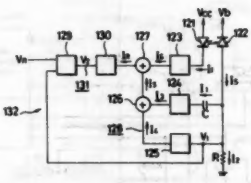
5,036,519

## SEMICONDUCTOR LASER CONTROLLER

Hidetoshi Ema, Yokohama, and Hiroshi Takahashi, Kawasaka, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Dec. 5, 1989, Ser. No. 446,583
Claims priority, application Japan, Dec. 5, 1988, 63-307543; Feb. 3, 1989, 1-24923; Feb. 3, 1989, 1-24924; Feb. 3, 1989, 1-24925; Feb. 3, 1989, 1-24926; Feb. 3, 1989, 1-24927; Feb. 3, 1989, 1-24928; Feb. 3, 1989, 1-24929; Feb. 3, 1989, 1-24930; Feb. 3, 1989, 1-24931; Feb. 3, 1989, 1-24932
Int. Cl.[5] H01S 3/00
U.S. Cl. 372—38 64 Claims




1. A semiconductor laser controller comprising:

photoelectric converting means for converting a light output of a driven semiconductor laser to a photovoltaic current proportional to the light output of the driven semiconductor laser and separating the photovoltaic current into high and low frequency components;

a photoelectric negative feedback loop for controlling a forward electric current of the semiconductor laser such that a sum of the high and low frequency components of the photovoltaic current converted by the photoelectric converting means is equal to a reference signal electric current defining the light output of the semiconductor laser; and

control means for controlling said reference signal electric current such that a voltage proportional to the low frequency component of the photovoltaic current converted by said photoelectric converting means is equal to a reference signal voltage corresponding to the reference signal electric current.

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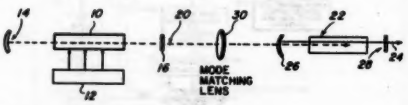
5,036,520

## HOLMIUM LASER PUMPED WITH A NEODYMIUM LASER

Steven R. Bowman, Galesville, and William S. Rabinovich, Wheaton, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 15, 1990, Ser. No. 597,127
Int. Cl.[5] H01S 3/16, 3/17
U.S. Cl. 372—41 12 Claims




1. A solid-state laser device comprising:

a holmium laser having a first host material doped with an amount of holmium ions sufficient to produce an output laser emission at about 3 μm when said holmium ions in said holmium laser are pumped by a pump beam at a wavelength of about 1.1 μm; and

neodymium laser pump source means for supplying a pump beam to pump said holmium ions in said holmium laser at a wavelength of about 1.1 μm.

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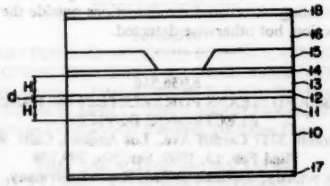
5,036,521

## SEMICONDUCTOR LASER DEVICE

Genichi Hatakoshi, Yokohama; Kazuhiko Itaya, Tokyo; Shigeya Naritsuka, Yokohama; Masayuki Ishikawa, Nishimine; Hajime Okuda, Yokohama; Hideo Shiozawa, Yokohama; Yukio Watanabe, Yokohama; Yasuo Ohba, Yokohama; Yoshihiro Kokubun, Yokohama, and Yutaka Uematsu, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 323,400, Mar. 14, 1989, Pat. No. 4,893,313. This application Nov. 21, 1989, Ser. No. 439,428
Claims priority, application Japan, Mar. 14, 1988, 63-59908; May 13, 1988, 63-114747; May 13, 1988, 63-114750; May 13, 1988, 63-114751
Int. Cl.[5] H01S 3/19
U.S. Cl. 372—46 12 Claims




1. A semiconductor laser device for emitting a laser beam having a wavelength λ, comprising:

a double-hetero structure including:

an active layer made of $In(Ga_{1-y}Al_y)P$ and having a thickness of d and a refractive index $n_1$ and first and second surfaces;

a first cladding layer of a first conductivity type formed on the first surface of the active layer having a refractive

index $n_{c1}$, made of $In(Ga_{1-x}Alx_x)P$, where x and y satisfy the inequality of $0 \leqq y < x \leqq 1$; and

a second cladding layer of a second conductivity type formed on the second surface of the active layer, having a refractive index $n_{c2}$, and made of $In(Ga_{1-z}Al_z)P$, where y and z satisfy the inequality of $0 \leqq y < z \leqq 1$, wherein said double-hetero structure satisfies the following inequality:

$$0.04\Delta\chi^1 \leqq d/\Lambda \leqq 0.09\ \Delta\chi^1$$

wherein $\Delta x$ is a difference between the aluminum composition ratio of the active layer and that of the cladding layer, and is defined as:

$\Delta x = (\Delta x_1 + \Delta x_2)/2$;

$\Delta x_1 = x - y$

$\Delta x_2 = x - y$.

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**5,036,522**

## SEMICONDUCTOR LASER WITH LOCALIZATION OF CURRENT

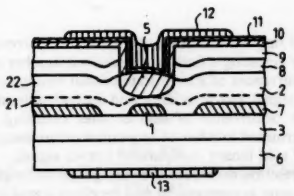
**Christian Tanguy, Saint-Michel; Guy Mesquida, Forges Les Bains, and Gerard-Maurice Marquebielle, Sainte Geneviéve des Bois, all of France, assignors to Thomson Hybrides, Puteaux, France**

**Filed May 24, 1990, Ser. No. 527,942**

**Claims priority, application France, Jun. 2, 1989, 89 07309**

**Int. Cl.[5] H01S *3/19***

**U.S. Cl. 372—46** **4 Claims**




1. In a semiconductor laser comprising at least one emissive strip sandwiched between two confinement layers, and at least one current injection metallization, wherein the first confinement layer above the emissive strip and below the current injection metallization has a gradient of doping that decreases towards the metallization, and wherein a diffusion of zinc through said first confinement layer creates a well providing a preferred localization of current through the emissive strip of the laser.

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**5,036,523**

## AUTOMATIC FREQUENCY CONTROL OF SATELLITE TRANSMITTED SPREAD SPECTRUM SIGNALS

**Robert D. Briskman, Bethesda, Md., assignor to Geostar Corporation, Washington, D.C.**

**Filed Oct. 3, 1989, Ser. No. 416,402**

**Int. Cl.[5] H04K *1/00***

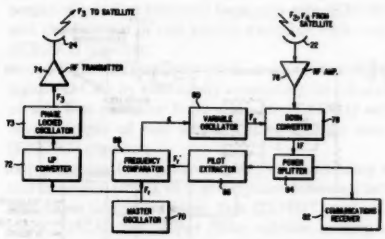
**U.S. Cl. 375—1** **59 Claims**

1. A radio communication system, comprising:

a remote transmitter for transmitting a burst mode, direct sequence spread spectrum information signal having a carrier center frequency $F_1$, a chip frequency $\alpha$, and a power versus frequency spectrum characterized by at least one intermediate null frequency at which the signal power has a minimum value, said null frequency occurring at $F_1 \pm K\alpha$, where K is an integer equal to or greater than 1;

a central station having a pilot signal transmitter for transmitter a pilot signal in the form of a continuous unmodulated carrier signal having a frequency substantially equal to said null frequency, and a receiver for receiving retransmitted information and pilot signals;

a signal relay for receiving the information signal from said remote transmitter and the pilot signal from said central station, and for retransmitting said information and pilot signals to the central station, said signal relay including a local oscillator which is susceptible to frequency drift; and




automatic frequency control means coupled to the receiver at said central station for detecting variations in the frequency of the received pilot signal and for adjusting the response of the receiver in accordance with said variations.

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**5,036,524**

## BINARY DATA SIGNAL TRANSMISSION SYSTEM

**Johannes W. M. Bergmans, Eindhoven, Netherlands; Seiichi Mita, Tokyo, Japan; Morishi Izumita, Tokyo, and Nobukazu Doi, Tokyo, Japan, assignors to N.V. Philips' Gloeilampenfabrieken, Netherlands and Hitachi Ltd., Japan**

**Filed Jan. 29, 1990, Ser. No. 473,251**

**Claims priority, application Japan, Jan. 27, 1989, 1-16486**

**Int. Cl.[5] H04L *25/49***

**U.S. Cl. 375—12** **4 Claims**

1. System for transmitting a binary source signal from a data transmitter to a data receiver through a noisy dispersive channel, the data transmitter comprising a sliding block encoder for converting the binary source signal at a given symbol rate 1/T into an encoded binary data signal at a symbol rate P/(NT), where P and N are positive integers such that $N/P \leqq 2\log(3)/2 = 0.79258$, said channel introducing into the encoded data signal intersymbol interference and noise, and the data receiver comprising the cascade of an equalizer and a sampler for producing samples at the output of the sampler at a sampling rate P/(2NT), and a reconstruction circuit for producing from said samples a reconstructed binary source signal at the symbol rate 1/T, wherein the reconstruction circuit comprises a detector for producing a ternary data signal at the symbol rate P(2NT) in response to said samples, and a decoder with memory for deriving the reconstructed binary source signal in a manner that each symbol of said reconstructed binary signal is derived as a function of at least two successive symbols of said ternary data signal.

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**5,036,525**

## ADAPTIVE EQUALIZER

**Hee Wong, San Jose, Calif., assignor to National Semiconductor Corp., Santa Clara, Calif.**

**Division of Ser. No. 108,718, Oct. 14, 1987, Pat. No. 4,873,700.**

**This application May 17, 1989, Ser. No. 353,409**

**Int. Cl.[5] H03K *5/159***

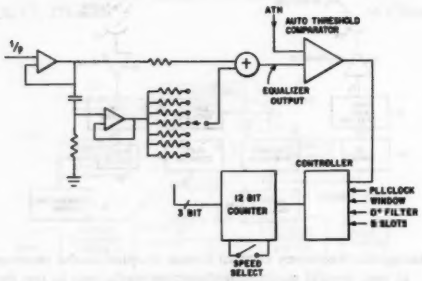
**U.S. Cl. 375—14** **2 Claims**

1. An adaptive equalizer for compensating input signal frequency and phase distortions introduced in the input signal transmission media, the adaptive equalizer comprising

frequency selection means responsive to the input signal and a feedback signal for generating an equalizer output signal having a selected frequency;

comparative means for slicing the equalizer output signal at predetermined levels to provide a comparator output signal;

a controller which receives the comparator output signal and provides a controller output signal representative of the voltage level of the comparator output signal; and




digital filter means which receives the controller output signal and generates a corresponding binary signal as the feedback signal to the frequency selection means.

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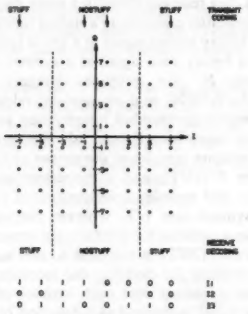
**5,036,526**

## METHOD OF COMMUNICATING STUFFING INDICATIONS IN A MULTI-LEVEL COMMUNICATIONS SYSTEM

**John D. McNicol, Nepean, and Iwan D. Jemczyk, Ottawa, Both of Canada, assignors to Northern Telecom Limited, Montreal, Canada**

**Filed Aug. 10, 1987, Ser. No. 82,893**
**Int. Cl.[5] H04L *7/04***
**U.S. Cl. 375—39** **28 Claims**




15. A method of transmitting stuffing indications for a stuffed data signal in a multi-level transmission system, comprising the step of transmitting each stuffing indication only once using signal points of a single transmitted symbol to represent different states of the stuffing indication, the signal points representing said different states having a minimum separation which is greater than a predetermined minimum signal point separation of the system.

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**5,036,527**

## ITERATIVE AUTOMATIC GAIN CONTROL FOR AN ANALOG FRONT END OF A MODEM

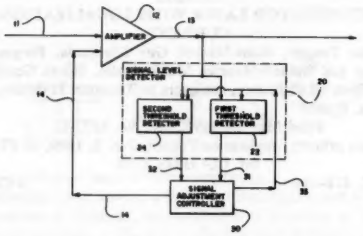
**Raouf Halim, Alpharetta, and Daryush Shamlou, Duluth, both of Ga., assignors to Hayes Microcomputer Products, Inc., Norcross, Ga.**

**Filed Feb. 5, 1990, Ser. No. 475,030**
**Int. Cl.[5] H03G *3/20***
**U.S. Cl. 375—98** **16 Claims**

1. An apparatus for maintaining the level of a received signal in the analog front end of a modem between a first reference level and a second reference level, comprising:

amplification means for amplifying an incoming signal by one of a plurality of predetermined discrete gain level in response to a control signal to provide said received signal;

first detection means for providing a first signal having a first state in response to said received signal level being below said first reference level and alternately having a second state in response to said received signal level exceeding said first reference level, comprising a comparator for comparing said received signal level to said first reference level and for providing a binary comparator output signal in response thereto at a comparator output, means for clocking said binary comparator output signal into a counter in response to a clock signal, said counter provid-




ing said first state in response to each occurrence of said counter counting a first predetermined number of sequential occurrences of a zero-state of said binary comparator output signal and providing said second state in response to each occurrence of said counter counting a second predetermined number of sequential occurrences of a one state of said binary comparator output signal;

second detection means for providing a second signal having a third state in response to said received signal level being below said second reference level and alternately having a fourth state in response to said received signal level exceeding said second reference level; and

signal adjustment means for providing said clock signal and for providing said control signal in response to said first and second signals to maintain said received signal level below said second reference level.

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**5,036,528**

## SELF-CALIBRATING CLOCK SYNCHRONIZATION SYSTEM

**Duc N. Le, Santa Clara; Lordson L. Yue, Sunnyvale; Cirillo L. Costantino, Castro Valley; David P. Chengson, Mountain View, and Aurangzeb K. Khan, Cupertino, all of Calif., assignors to Tandem Computers Incorporated, Cupertino, Calif.**

**Filed Jan. 29, 1990, Ser. No. 471,915**
**Int. Cl.[5] H03D *3/24***
**U.S. Cl. 375—119** **13 Claims**

1. A clock synchronization system for providing a system clock signal synchronized to a reference clock signal, the system comprising:

input means for receiving a first clock signal;

first circuit means coupled to the input means to receive the first clock for developing therefrom a plurality of phase-related second clock signals, each of the second clock signals having a frequency substantially identical to that of the first clock signal;

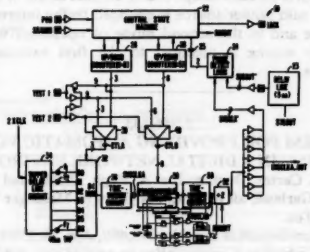
first multiplexer means coupled to receive the plurality of second clock signals for selecting a one of the second clock signals in response to control signals;

second circuit means coupled to receive the selected one of the second clock signals for developing therefrom a plurality of phase-related third clock signals, each of the third

clock signals having a frequency substantially identical to that of the first clock signal;

second multiplexer means coupled to receive the plurality of third clock signals for selecting a one of the third clock signals in response to said control signals, the selected one the third clock signals forming the system clock signal;

third circuit means operably coupled to receive and com-



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**5,036,529**

## DIGITAL AUTO-PHASE-CONTROLLED RETIMING CIRCUIT

**Dong K. Shin, Seoul, Rep. of Korea, assignor to Electronics and Telecommunications Research Institute and Korea Telecommunication Authority, both of, Rep. of Korea**

**Filed Apr. 20, 1990, Ser. No. 514,860**

**Claims priority, application Rep. of Korea, Jun. 13, 1989, 1989-8113**

**Int. Cl.[5] H03L** *7/081*

**U.S. Cl. 375—119** **4 Claims**

1. A digital auto-phase-controlled retiming circuit, comprising:

a first logic sum gate (OR1) for receiving input data signals (DINDT) having controlled phase and for producing a first and a second data signal;

a second logic sum gate (OR2) for receiving a input clock and for producing a first clock and a inverted second clock;

a first D flip-flop (FF1) for producing retimed data signal according to said inverted second clock and having a data input terminal for receiving said first data signal from said first logic sum gate (OR1) and a clock terminal for receiving said inverted second clock from said second logic sum gate (OR2);

a second D flip-flop (FF2) for producing retimed data signal according to said first clock and having a data input terminal for receiving a second data signal from said first logic sum gate (OR1) and a clock terminal for receiving said first clock from said second logic sum gate (OR2);

a first exclusive logic sum gate (EXOR1) for producing a first output (S-2) and a inverted second output (S-1) by ORing exclusively said retimed data signal of said first D flip-flop (FF1) and said first data signal of said first logic sum gate (OR1);

a second exclusive logic sum gate (EXOR2) for producing a third output (S-4) and inverted fourth output (S-3) by ORing exclusively said retimed data signal of said second D flip-flop (FF2) and said second data signal of said first logic sum gate (OR1);

a first logic sum means for producing a first phase state signal (U-CK) by electrically connecting said second output of said first exclusive logic sum gate (EXOR1) and said third output of said second exclusive logic sum gate (EXOR2) together;

a second logic sum means for producing a second phase state signal (D-CK) by electrically connecting said first output of said first exclusive logic sum gate (EXOR1) and said fourth output of said second exclusive logic sum gate (EXOR2) together;

a loop processor (U2) generating and then providing a control bus signal (PSC), so that the phase difference between said phase controlled input data (DINDT) and an input clock (INCK) has proper phase relation making use of output signals (U-CK, D-CK) of said first and second logic sum means; and

a phase shifter (U3) controlling the phase of said input data according to said control signal from said loop processor (U2) and then providing the phase controlled input data (DINDT) into said first logic sum gate (OR1),

wherein said input clock (INCK) is a retiming clock (RTCK) and the output of said second D flip-flop (FF2) is a retimed data signal (RTDT).

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**5,036,530**

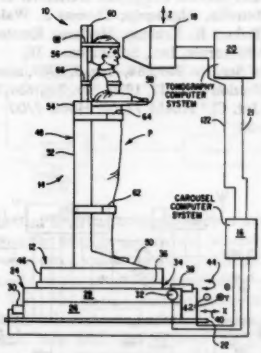
## EMISSION TOMOGRAPHY CAROUSEL SYSTEM AND METHOD

**Leonard D. DiGiovanna, West Hempstead, and Patrick F. Panetta, East Islip, both of N.Y., assignors to A.T.F. Consolidated, Inc., Deer Park, N.Y.**

**Filed Oct. 23, 1989, Ser. No. 425,338**

**Int. Cl.[5] H05G** *1/00*

**U.S. Cl. 378—208** **6 Claims**




1. An emission tomography carousel system for use with a stationary radiation detector comprising:

a platform for receiving a patient who has a body that defines a vertical axis through the center thereof;

movable mounting means for supporting said platform;

means for moving said mounting means in translational movements in orthogonal directions;

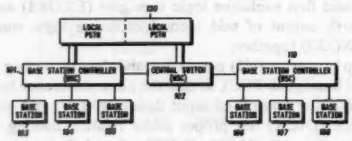
means for rotating said mounting means; and

automatic programmable means for directing the movement of said mounting means about a predetermined locus of points such that said platform moves in a predetermined manner with respect to the stationary radiation detector so as to keep a point of interest that is off the vertical axis of the patient in substantially the center of the locus of points.

## 5,036,531
## LOCAL PSTN INTERCONNECT WITH REMOTE SIGNAL LINK PROCESSING

**Stephen L. Spear, Skokie, Ill., assignor to Motorola Inc., Schaumburg, Ill.**

**Filed Feb. 27, 1990, Ser. No. 485,407**
**Int. Cl.[5] H04M *11/00***
**U.S. Cl. 379—58** **1 Claim**



1. A radiotelephone switching network for switching a voice signal portion of a telephone signal, the telephone signal comprising the voice signal and signalling information, between a first base site of a cell having a plurality of base sites, and a public switched telephone network (PSTN), the radiotelephone switching network comprising:

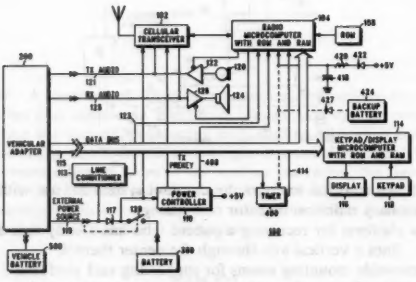
a) a mobile switching center, coupled to the PSTN, for processing the signalling information to produce a control signal; and

b) a plurality of base station controllers, connected to and controlled by the mobile switching center, at least one base station controller connected to the PSTN, each base station controller coupled to and controlling a cell having a plurality of base sites each base station controller connected to the PSTN switching the voice signal between a first base site of a first cell and the PSTN or the mobile switching center, in response to the control signal.

## 5,036,532
## PORTABLE TELEPHONE WITH POWER SOURCE/MODE CHANGE DURING CALLS

**Michael P. Metroka, Algonquin; Thomas J. Walczak, Woodstock, and Robert K. Krolopp, Hoffman Estates, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.**

**Continuation of Ser. No. 389,084, Aug. 3, 1989, abandoned. This application Dec. 27, 1990, Ser. No. 634,784**
**Int. Cl.[5] H04M *11/00*; H04B *7/00***
**U.S. Cl. 379—58** **12 Claims**



7. A portable radiotelephone for communicating radiotelephone calls, said portable radiotelephone having a power source which may be changed between internal power sources, first external power sources, or the internal power source and the first external power source, and said portable radiotelephone having at least first and second modes of operation when coupled to the internal power source and the first external power source, respectively, said portable radiotelephone comprising:

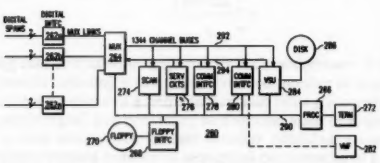
timing means for producing, in response to an interruption of said power source, an output signal for a predetermined time interval; and

control means including memory means for storing, during a radiotelephone call, pre-selected information identifying the radiotelephone call, and said control means re-entering the radiotelephone call corresponding to said stored pre-selected information when said power source is changed and said output signal is present, and operating said portable radiotelephone in the first mode of operation when said power source is changed to the internal power source and in the second mode of operation when said power source is changed to the first external power source.

## 5,036,533
## SYSTEM FOR PROVIDING AUTOMATIC VOICE MESSAGING IN A DIGITAL NETWORK ENVIRONMENT

**Howard E. Carter, Denton; Joel A. Pugh, Dallas, and Byron C. Pierce, Garland, all of Tex., assignors to Messager Partners, Dallas, Tex.**

**Continuation-in-part of Ser. No. 342,480, Apr. 24, 1989, Pat. No. 4,901,341, which is a continuation-in-part of Ser. No. 209,891, Jun. 22, 1988, Pat. No. 4,825,460. This application Feb. 12, 1990, Ser. No. 478,674**
**Int. Cl.[5] H04M *1/64, 7/06, 11/00***
**U.S. Cl. 379—59** **12 Claims**



1. An automatic voice messaging system for use in a telephone network having a first switch means and a second switch means connected by a plurality of digital serial links, comprising:

processor means for controlling the operation of the voice messaging system;

a plurality of interface circuits for interfacing to the digital serial links;

a multiplexer connected to the plurality of interface circuits and having an output bus, the multiplexer being controlled by the processor means to selectively connect telephone signals from the digital serial links to the output bus;

caller-controlled automatic voice messaging service means connected to the output bus of the multiplexer and being controlled by the processor means for providing automatic voice messaging for the plurality of digital links, the automatic voice messaging service means comprising:

means for detecting telephone signals representing busy or ring/no answer conditions at a called station upon call initiation to the called station by a caller at a calling station;

means for informing the caller of availability of automatic voice messaging services;

means for detecting receipt of a predetermined acceptance code from the calling station indicating that the caller desires to leave a message for the called station;

means for determining ANI or billing information from the caller at the calling station;

storage means connectable to the multiplexer by the processor means following receipt of the predetermined acceptance code for receiving and storing a message for the called station, and for storing ANI or billing information;

means for signaling the called station;

means for locating an open digital serial link and for connecting the signaling means to the open digital serial link to signal the called station; and

means responsive to the called station going off-hook for delivering the message to the called station.

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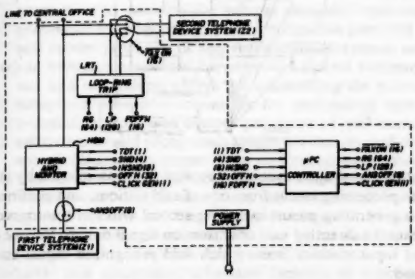
**5,036,534**

## INTELLIGENT TELEPHONE INTERFACE FOR AUTOMATIC ANSWERING SYSTEMS, AND METHOD OF USING

**Kenneth Gural, 7207 Dartmouth Ave., College Park, Md. 20740**

**Filed Jan. 31, 1989, Ser. No. 304,217**
**Int. Cl.[5] H04M** *1/64, 11/00*
**U.S. Cl. 379—67** **30 Claims**




1. In a subscriber's communication terminus for communication with a central office over a communication channel; wherein said terminus comprises a first subsystem (hereinafter "(Z1)") having a plurality of predefined OFF HOOK modes of operation; and a second subsystem (hereinafter "(Z2)");

the method for controlling communication between (Z1), (Z2), and said central office upon reception of a call actuating signal from said central office comprising:

passing said call actuating signal to (Z1) while blocking said call actuating signal from reaching (Z2);

monitoring said communication channel to detect an OFF HOOK condition indicating that (Z1) is in one of said OFF HOOK modes of operation;

monitoring said communication channel to detect mode-characteristic signals identifying each of said OFF HOOK modes of operation of (Z1) as they occur; while monitoring said communication channel to detect an off-mode condition not corresponding to at least one of said OFF HOOK modes of operation and in response thereto,

placing (Z2) in communication with said central office.

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**5,036,535**

## SWITCHLESS AUTOMATIC CALL DISTRIBUTION SYSTEM

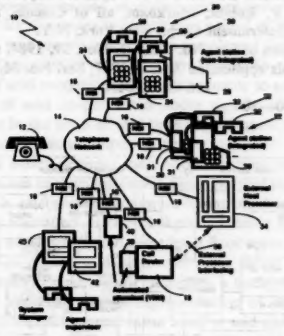
**Jerry Gechter, Lincoln; Jeffrey A. Fried, Somerville, and Robert L. Pokress, Andover, all of Mass., assignors to UNIFI Communications Corporation, Billerica, Mass.**

**Filed Nov. 27, 1989, Ser. No. 441,945**
**Int. Cl.[5] H04M** *3/42*
**U.S. Cl. 379—210** **63 Claims**

1. An automatic call distributing system for automatically distributing telephone calls placed over a network to one of a plurality of agent stations connected to said network via network service interfaces and providing agent status messages to said network, said system comprising

receiving means connected via a network service interface to said network for receiving said agent status messages and call arrival messages from said network indicating that incoming calls have been made on said network, said agent status messages being generated at said agent stations and communicated through said network service interfaces and network to said receiving means, and

routing means responsive to said receiving means for generating a routing signal provided to the network to cause said network to establish a connection directly between said incoming call and an agent station through the network so that said connection is external of said routing means.



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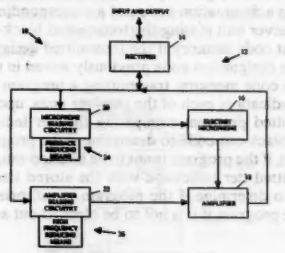
**5,036,536**

## ELECTRET MICROPHONE TRANSMITTER FOR USE IN TELEPHONE CIRCUITS

**David O. Hanon, and Ricky R. Walker, both of Ringgold, Ga., assignors to Plantronics, Inc., Santa Cruz, Calif.**

**Filed Feb. 20, 1990, Ser. No. 482,157**
**Int. Cl.[5] H04M** *1/60*
**U.S. Cl. 379—387** **11 Claims**




1. A transmitter for interfacing an electret microphone to a carbon compatible telephone network, wherein the electret microphone converts acoustic signals to corresponding electrical audio signals, said transmitter comprising:

a rectifier connected to said telephone network via first and second terminals and being adapted for receiving an electrical signal from said network over said first and second terminals and rectifying said electrical signal to provide a bias voltage to said electret microphone an said transmitter via positive and negative supply terminals; and

an amplifier connected to the positive and negative supply terminals and being adapted for receiving said audio signals from said electret microphone, amplifying said audio signals, and delivering said amplified audio signals to said telephone network through said rectifier via said positive and negative supply terminals and said first and second terminals, said amplifier comprising:

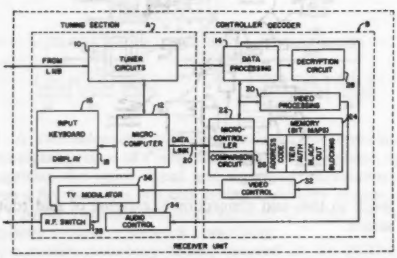
a first bipolar transistor having its base connected to the electret microphone and its emitter connected to the negative supply terminal of said rectifier; and

a second bipolar transistor connected to said first bipolar transistor as an emitter follower.

## 5,036,537
## GEOGRAPHIC BLACK-OUT METHOD FOR DIRECT BROADCAST SATELLITE SYSTEM

**John M. Jeffers, Downsview; S. Wayne Mundy, Brampton, and Stephen P. Knight, Markham, all of Canada, assignors to General Instrument Corp., New York, N.Y.**

**Continuation of Ser. No. 672,925, Nov. 19, 1984, abandoned. This application Apr. 3, 1987, Ser. No. 36,159**
**Int. Cl.[5] H04H 1/00**
**U.S. Cl. 380—20** **11 Claims**




1. A method for simultaneously preventing the display of a program by selected receiver units in a direct broadcast satellite system of the type including a plurality of receiver units each comprising a tier authorization memory, a designation code memory and a black-out code memory, the method comprising the steps of, prior to the transmission of a program the display of which is to be prevented, separately addressing each receiver unit, providing each addressed receiver unit with a tier authorization code for storage in its tier authorization code memory and providing each addressed receiver unit with a designation code for storage in the designation code memory of the receiver unit, globally addressing all receiver units and transmitting a designation code and a corresponding black-out code, a receiver unit storing the transmitted black-out code in its black-out code memory if the transmitted designation code matches the designation code previously stored in the receiver designation code memory, transmitting a program with a program tier indication, each of the receiver units, upon receiving the transmitted program, comparing the tier indication with the stored black-out code to determine if the program is to be blacked-out, if the program is not to be blacked-out, comparing the transmitted tier indication with the stored tier authorization code to determine if the program is authorized and displaying the program if it is not to be blacked-out and is authorized.

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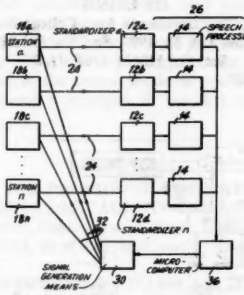
## 5,036,538
## MULTI-STATION VOICE RECOGNITION AND PROCESSING SYSTEM

**Stanley Oken, Melville; Rao Vemula, South Huntington, and Eugene Lee, Huntington Station, all of N.Y., assignors to Telephonics Corporation, Huntington, N.Y.**

**Filed Nov. 22, 1989, Ser. No. 440,518**
**Int. Cl.[5] G10L 7/08**
**U.S. Cl. 381—43** **5 Claims**

1. An electronic voice recognition system comprising a plurality of input stations coupled to a remotely positioned central processor, each of said input stations including microphone input means for generating an electrical signal corresponding to an audio input comprising voice and non-voice components, said microphone input means having means for attenuating said non-voice components such that said electrical signal is primarily voice-representative; processor means coupled to said input means for generating a digital computer-compatible output signal representing said voice component, said processor comprising a template whereby said electrical signal is compared to stored data to generate a pre-determined output signal upon correspondence therebetween; wireless transmission means for transmitting said digital output signal to a central facility; data processing means at said central facility for the reception and storage of said output signal for the implementation of computer routines upon receipt of said output signal; and confirmation-generating means operatively coupled to said data processing means for generating a confirmation signal upon successful receipt of a transmission by said data processing means from one of said stations, said confirmation generating means including second wireless transmission means for directing said confirmation signal only to the one of said input stations from which said recognized signal emanated.

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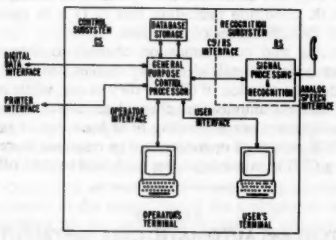
## 5,036,539
## REAL-TIME SPEECH PROCESSING DEVELOPMENT SYSTEM

**Edwin H. Wrench, Jr., and Alan L. Higgins, both of San Diego, Calif., assignors to ITT Corporation, New York, N.Y.**

**Filed Jul. 6, 1989, Ser. No. 376,076**
**Int. Cl.[5] G10L 7/08, 7/02**
**U.S. Cl. 381—43** **11 Claims**




1. A real-time speech processing development system comprising:

(a) a speech recognition subsystem including a master processor, a template matching processor, a speech signal processor, and speech signal input means coupled to said speech signal processor, wherein said master processor is configured to receive internal subsystem operation commands for performing speech recognition and to thereupon generate subsystem execution commands for real-time operation of said speech signal processor to process speech signals received from a user through said speech signal input means into corresponding digital representations, and of said template matching processor to compare the digital representations provided by said speech signal processor with stored templates of word or sound units and to produce a real-time speech recognition output based thereon;

(b) a control subsystem including an operator interface for control communications with a system operator, a user interface for control communications with a user, a con-

trol program module, a database storage used by said control subsystem for storing data files for said speech processing development system, and a control processor connected to said operator interface, said user interface, and said control program module, wherein said control processor is configured to receive operator control input through said operator interface and to access said control program module to load one of plurality of control programs selected by the operator, including a speech recognition control program, and wherein said control processor is further configured to operate said user interface, when the speech recognition control program is selected by the operator, for control communications with the user, and to execute said speech recognition control program so as to generate the internal subsystem operation commands for performing speech recognition provided to said master processor of said recognition subsystem; and

(c) an interface connected between said control subsystem and said recognition system for transmitting the internal subsystem operation commands for performing speech recognition from said control processor of said control subsystem to said recognition subsystem and the real-time speech recognition output from said recognition subsystem to said user interface of said control subsystem, whereby said control subsystem can be accessed by the operator for non-real-time system development functions while said recognition subsystem can be accessed by the user for real-time speech recognition functions.

wherein said recognition subsystem includes an execution control program executed by said master processor for generating the subsystem execution commands in response to an internal subsystem operation command received from said control subsystem, and

wherein said execution control program includes a plurality of execution program modules having different programmed priority levels, and means for assigning subsystem execution commands for tasks to be executed to said modules and for activating said subsystem execution commands according to the priorities of the respective modules.

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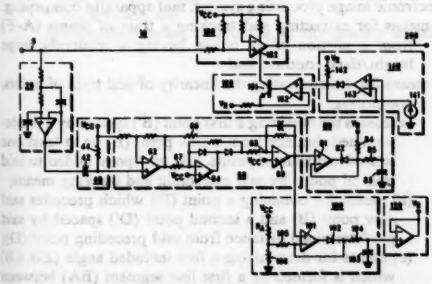
**5,036,540**

## SPEECH OPERATED NOISE ATTENUATION DEVICE

**Bruce C. Eastmond, Downers Grove, Ill., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Sep. 28, 1989, Ser. No. 413,910**
**Int. Cl.[5] H04B *15/00***
**U.S. Cl. 381—47** **5 Claims**



1. A speech operated noise attenuation device for reducing background noise in audio signals input to said speech operated noise attenuation device, said speech operated noise attenuation device receiving only un-processed speech signals from a radio receiver demodulator, said speech operated noise attenuation device comprising:

a current controlled attenuator receiving audio signals, having a control input, that varies the attenuation of audio signals input to said current controlled attenuator in response to a control signal input to said current controlled attenuator through said control input;

signal processing means, receiving said un-processed audio signals, for dynamically identifying a level of background noise in said un-processed audio signals and for providing a first dynamically varying control signal to said control input of said current controlled attenuator to adjust attenuation of said un-processed audio signals according to changes in the level of said background noise, said signal processing means comprised of:

a signal valley detector means for detecting the average minimum background noise signal present in said audio signals, said average minimum background noise signals being identified as the background noise signal level floor, said background noise level floor representing the average minimum background noise signal present in said audio signal and for providing a background noise level reference signal representative of the average minimum background noise level in said audio signal;

control circuit means responsive to said background noise level reference signal from said signal valley detector means for generating a second control signal, said second control signal being coupled to said control input of said current controlled attenuator to control attenuation of said audio signal by said current controlled attenuator.

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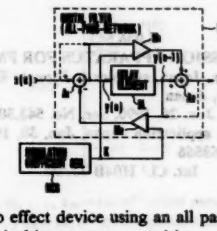
**5,036,541**

## MODULATION EFFECT DEVICE

**Mitsumi Kato, Hamamatsu, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan**

**Filed Feb. 19, 1988, Ser. No. 161,344**
**Int. Cl.[5] H03G *3/00***
**U.S. Cl. 381—62** **18 Claims**



1. A vibrato effect device using an all pass network for an electronic musical instrument comprising:

a musical tone signal generator for generating a musical tone signal having a certain pitch and phase characteristic;

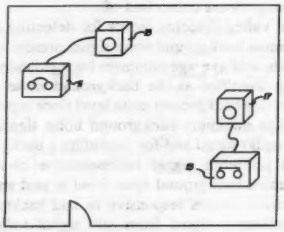
a digital filter connected to said musical tone signal generator for receiving said musical tone signal and for modifying the phase characteristic of said musical tone signal without introducing appreciable attenuation of an amplitude characteristic of said musical tone, said musical tone being represented by simple data which has been converted into digital code, said digital filter having a multiplier for attenuating amplitudes of signals not representative of said musical tone signal and a delay element having a variable delay time; and

a coefficient generator for supplying to said multiplier a multiplication coefficient which varies with time and for determining the variable delay time of the delay element thus producing as an output of said digital filter, a musical tone signal with its phase or frequency modulated in relation to the variation with time of said multiplication coefficient.

## 5,036,542
## AUDIO SURVEILLANCE DISCOURAGEMENT APPARATUS AND METHOD

Brian D. Kehoe, 1409-B G St., NE., Washington, D.C. 20002, and Noel D. Matchett, 1001 Spring St., #505, Silver Spring, Md. 20910

Filed Nov. 2, 1989, Ser. No. 430,356
Int. Cl.[5] H04R 3/02
U.S. Cl. 381—73.1 20 Claims



1. An audio surveillance discouragement apparatus comprising:

first means for generating a first signal having a plurality of voice signals, synthesized vocal signals, and dummy intelligence signals, mixed with pink noise having a pocket of approximately 20 dB near 500 Hz;

first speaker means coupled to said first generating means for radiating said first signal;

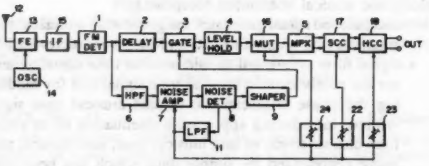
second means for generating a second signal nonsynchronous with said first signal, with the second signal having a plurality of voice signals, synthesized vocal signals, and dummy intelligence signals, mixed with pink noise having a pocket of approximately 20 dB near 500 Hz; and

second speaker means coupled to said second generating means for radiating said second signal wherein said first speaker is located a distance from said second speaker and for spatially mixing the radiated first signal with the radiated second signal, respectively.

## 5,036,543
## NOISE SUPPRESSION APPARATUS FOR FM RECEIVER

Eiji Ueno, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Jun. 26, 1990, Ser. No. 543,305
Claims priority, application Japan, Jun. 30, 1989, 1-168565; Jun. 30, 1989, 1-168566
Int. Cl.[5] H04B 15/00
U.S. Cl. 381—94 4 Claims




3. A noise suppression apparatus for an FM receiver comprising:

first amplifying means (6,7) for extracting a noise component from an FM detected signal;

first noise detecting means (8,9) for outputting a first control signal when an output of said first amplifying means (6,7) exceeds a predetermined level;

first d-c signal producing means for producing a first d-c signal in accordance with an output level of said first amplifying means (6,7) to control a gain of said first amplifying means (6,7);

a second amplifying means (25) for extracting a high frequency component of noise in an intermediate frequency signal;

second noise detecting means (26,27) for outputting a second control signal when an output of said second amplifying means (25) exceeds a predetermined level;

second d-c signal producing means (28) for producing a second d-c signal in accordance with an output level of said second amplifying means (25) to control a gain of said second amplifying means;

gate means (3) through which said FM detected signal passes, said gate means being closed by said first and second control signals to inhibit the passage of said FM-detected signal;

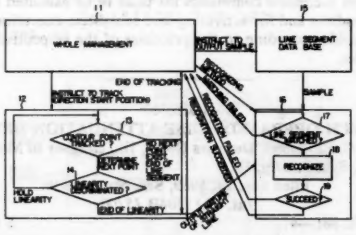
stereo separation control means (22) for continuously varying a stereo separation between a left channel and a right channel of a speaker output of the FM receiver in accordance with said first d-c signal when said first d-c signal decreases below a predetermined level; and

high frequency response control means (23) for continuously varying frequency responses of said left and right channels in accordance with said first d-c signal when said first d-c signal decreases below a predetermined level.

## 5,036,544
## APPARATUS FOR DISCRIMINATING LINEARITY OF LINE SEGMENT IN IMAGE PROCESSING SYSTEM

Yoshikazu Sakaue; Kazuhiko Sumi, and Keiji Nakajima, all of Hyogo, Japan, assignors to Mitsubishi Kenki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 10, 1989, Ser. No. 321,770
Claims priority, application Japan, Mar. 10, 1988, 63-57765
Int. Cl.[5] G06K 9/46
U.S. Cl. 382—24 8 Claims




1. An apparatus for discriminating linearity of a line segment in an image to be displayed which can be processed in an electronic image processing system, said apparatus comprising:

means for extracting and tracking a train of points (A–F) from a portion of an image having a relatively large bright/dark contrast; and

means for discriminating the linearity of said train of points, comprising:

(a) means for obtaining a first point (B') spaced by a predetermined distance from a new point (B) on at least one side of said train of points, said new point added to said train of points by said extracting and tracking means;

(b) means for obtaining a point (D) which precedes said new point (B) and a second point (D') spaced by said predetermined distance from said preceding point (D);

(c) means for determining a first included angle (∠B'AB) which is formed by a first line segment (BA) between said new point (B) and a start point (A) of said train of points and a second line segment (B'A) between said first point (B') and said start point (A);

(d) means for determining a second included angle (∠D-'AD) which is formed by a third line segment (DA) between said preceding point (D) and said start point (A) and a fourth line segment (D'A) between said second point (D') and said start point (A); and

(e) means for comparing said first included angle (∠B'AB) with said second included angle (∠D'AD) so as to detect the end of linearity of said train of points at said preceding point (D).

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**5,036,545**

## PICTURE IMAGE READING SYSTEM

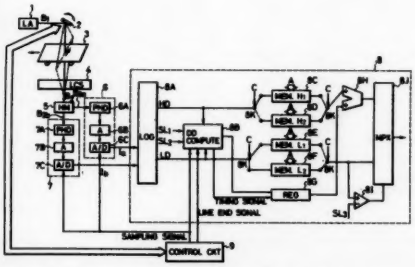
**Yoshihiko Iida; Mitsuru Ikeda; Ken Ishikawa, all of Chiba, and Isao Horiba, Aichi, all of Japan, assignors to Hitachi Medical Corporation, Tokyo, Japan**

**Continuation of Ser. No. 736,730, May 22, 1985, abandoned. This application Aug. 19, 1988, Ser. No. 235,729**

**Claims priority, application Japan, May 22, 1984, 59-104271**

**Int. Cl.[5] G06K 9/00**

**U.S. Cl. 382—62** **12 Claims**




1. In a picture image reading system having a scanning system for scanning the surface of a picture image medium with light beams, an optical system for condensing the light beams received from said picture image medium and dividing the light beam into a plurality of light beams, and a plurality of density readers respectively responsive to said plurality of light beams where each density reader reads a predetermined range of density signals different from the ranges read by the remaining density readers, the improvement comprising

means for establishing the density signal ranges read by the readers such that adjacent density signal ranges partially overlap one another with a high end of one of the adjacent density signal ranges overlapping a low end of another one of the adjacent density signal ranges;

detecting means responsive to the density signals from said plurality of readers for detecting occurrence of density signals in overlapping portions at density signal ranges where the density signal ranges of adjacent readers overlap and providing an overlap signal indicative of said occurrence; and

synthesizing means responsive to the density signals read from said plurality of readers and said overlap signal for connecting the density signals from the plurality of readers to synthesize a composite density signal corresponding to the entire density range of the picture.

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**5,036,546**

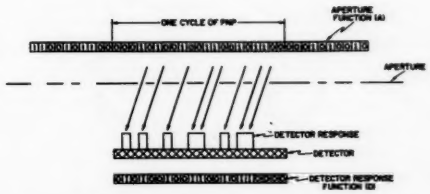
## PSEUDO-NOISE PRODUCT CODED APERTURE ARRAYS AND METHOD FOR DESIGNING SAME

**Stephen R. Gottesman, Huntington, and Edward J. Schneid, Commack, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.**

**Continuation-in-part of Ser. No. 916,000, Oct. 6, 1986, abandoned. This application Mar. 8, 1989, Ser. No. 320,769**

**Int. Cl.[5] G06K 9/20**

**U.S. Cl. 382—65** **13 Claims**




1. A coded aperture array comprising transparent and opaque elements, said coded aperture array being entirely interconnected and self-supporting, the elements of said coded aperture array being defined as being one of transparent and opaque in correspondence with an array pattern defined by the direct product of two pseudo-noise sequences, said direct product being defined by the relationship

$$PNP = \begin{bmatrix} a_1b_1 & a_1b_2 & \cdots & a_1b_n \\ a_2b_1 & a_2b_2 & \cdots & a_2b_n \\ \cdot & \cdot & & \cdot \\ \cdot & \cdot & \cdots & \cdot \\ \cdot & \cdot & & \cdot \\ a_mb_1 & a_mb_2 & \cdots & a_mb_n \end{bmatrix}$$

where $a_1, a_2, \ldots, a_m$ = an $m^{th}$ order pseudo-noise sequence and $b_1, b_2, \ldots, b_n$ = an $n^{th}$ order pseudo-noise sequence.

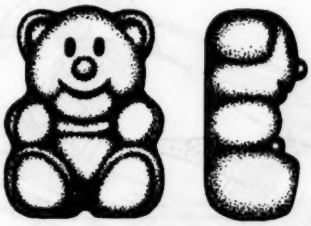
# DESIGN PATENTS

## GRANTED JULY 30, 1991

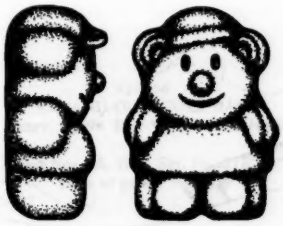
### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| D11-117 | 318,605 |

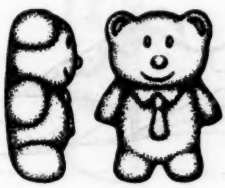
318,554
SNACK FOOD
Jane E. Alpers, Minneapolis, and Joseph E. Greenwald, New Brighton, both of Minn., assignors to Geenral Mills, Inc., Minneapolis, Minn.
Filed Nov. 2, 1988, Ser. No. 266,025
Term of patent 14 years
U.S. Cl. D1—110



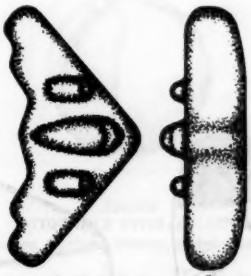
318,555
SNACK FOOD
Jane E. Alpers, Minneapolis, and Joseph E. Greenwald, New Brighton, both of Minn., assignors to General Mills, Inc., Minneapolis, Minn.
Filed Nov. 2, 1988, Ser. No. 266,027
Term of patent 14 years
U.S. Cl. D1—110



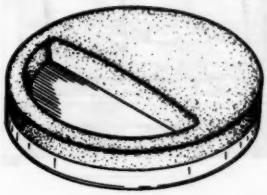
318,556
SNACK FOOD
Jane E. Alpers, Minneapolis; Joseph E. Greenwald, New Brighton; Christopher B. Foote, Minneapolis; James J. MacLachlan, Maple Grove, and Robert A. Will, Eagan, all of Minn., assignors to General Mills, Inc., Minneapolis, Minn.
Filed Nov. 2, 1988, Ser. No. 266,024
Term of patent 14 years
U.S. Cl. D1—110



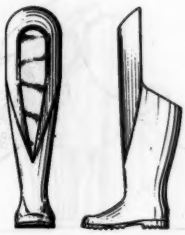
318,557
SNACK FOOD PRODUCT
John D. Wanvig; Erin K. Taylor, both of Minneapolis, and Eugene P. Buck, St. Paul, all of Minn., assignors to General Mills, Inc., Minneapolis, Minn.
Filed Feb. 5, 1990, Ser. No. 474,862
Term of patent 14 years
U.S. Cl. D1—113



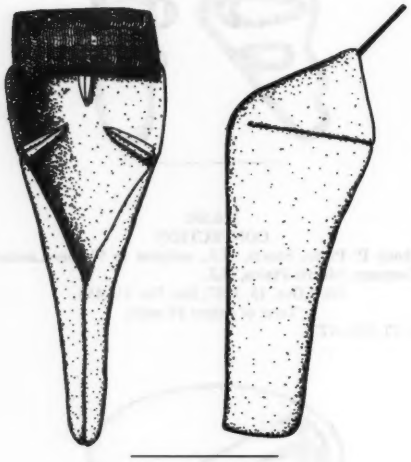
318,558
CONFECTION
Anthony P. Piano, Sparta, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.
Filed Dec. 15, 1987, Ser. No. 133,453
Term of patent 14 years
U.S. Cl. D1—127



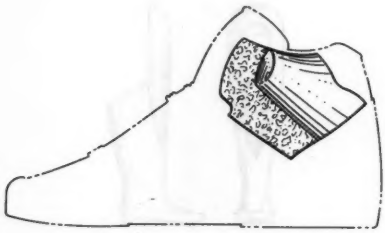
318,559
PADDED KNEE BOOT
Michael T. Slason, 8987 Aberdare St., Ventura, Calif. 93004
Filed Oct. 6, 1988, Ser. No. 254,125
Term of patent 14 years
U.S. Cl. D2—272



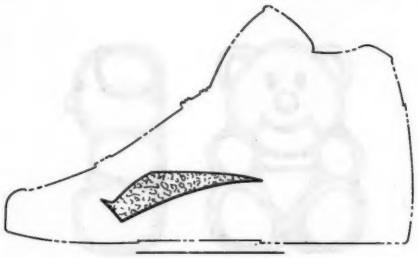
318,560
HIGH HEEL PROTECTOR
Marylynn G. Fitzpatrick, 6525 Wandsworth Cir., Indianapolis, Ind. 46250, and Rue A. Flanders, 9201 Eastwind Dr., Indianapolis, Ind. 46256
Continuation-in-part of Ser. No. 72,589, Jul. 13, 1987, Pat. No. Des. 306,932. This application Aug. 22, 1988, Ser. No. 234,844
Term of patent 14 years
U.S. Cl. D2—277



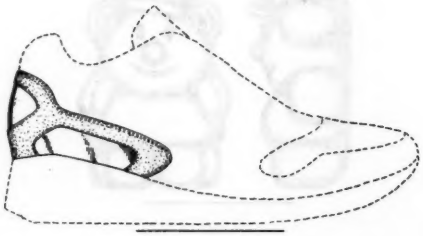
318,561
ELEMENT OF A SHOE UPPER
Suzann Jimenez, Whittier, Calif., assignor to L.A. Gear, Inc., Los Angeles, Calif.
Division of Ser. No. 247,422, Sep. 21, 1988, Pat. No. Des. 300,181. This application Jan. 19, 1989, Ser. No. 298,667
Term of patent 14 years
U.S. Cl. D2—314



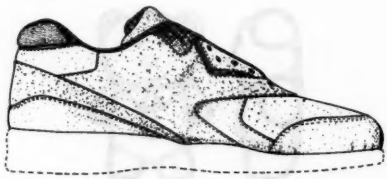
318,562
ELEMENT OF A SHOE UPPER
Suzann Jimenez, Whittier, Calif., assignor to L.A. Gear, Inc., Los Angeles, Calif.
Division of Ser. No. 247,422, Sep. 21, 1988, Pat. No. D. 300,181. This application Jan. 13, 1989, Ser. No. 297,539
Term of patent 14 years
U.S. Cl. D2—314



318,563
HEEL ELEMENT OF A SHOE
Robert J. Lucas, Lake Oswego, Oreg., assignor to Nike, Inc. and Nike International Ltd., both of Beaverton, Oreg.
Filed Jun. 15, 1990, Ser. No. 538,500
Term of patent 14 years
U.S. Cl. D2—314

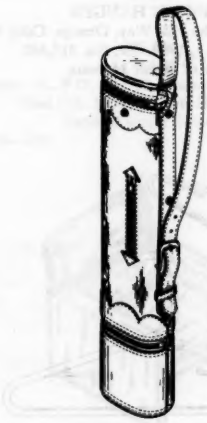


318,564
SHOE UPPER
Janelle Dahlsten, Lake Oswego, Oreg., assignor to Avia Group International, Inc., Portland, Oreg.
Filed Jun. 25, 1990, Ser. No. 543,568
Term of patent 14 years
U.S. Cl. D2—314



318,565
PROPHYLACTIC CONTAINER
Thomas G. Kearney, W221 N2670 Lindenwood Ct., and Charles K. Johnson, 21885 Hillcrest Dr., both of Waukesha, Wis. 53186
Filed Mar. 22, 1988, Ser. No. 171,925
Term of patent 14 years
U.S. Cl. D3—30.1

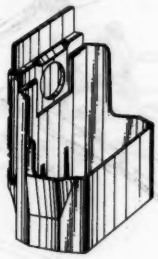
318,566
EXPANDABLE GOLF BAG
Donald E. Henry, 19498 Red Wing Blvd., Hastings, Minn. 55033
Filed Nov. 25, 1988, Ser. No. 277,212
Term of patent 14 years
U.S. Cl. D3—37



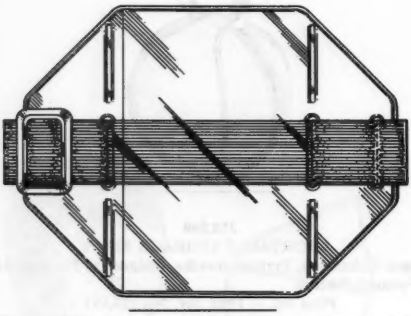
318,567
BALL BAG
Theophilus E. Smith, 1013 Griswold Rd., Fairfield, Ala. 35064-2815
Filed Sep. 18, 1987, Ser. No. 98,133
Term of patent 14 years
U.S. Cl. D3—44

318,568
PORTABLE STORAGE BIN
Jörgen Håkansson, Tyringe, Sweden, assignor to Perstorp AB, Perstorp, Sweden
Filed Jul. 7, 1988, Ser. No. 220,091
Claims priority, application Sweden, Jan. 22, 1988, 88-0124
Term of patent 14 years
U.S. Cl. D3—74

318,569
CARRYING CASE FOR A PORTABLE RADIO
Henry A. Schaefer, Lynchburg, Va., assignor to The General Electric Company, Lynchburg, Va.
Filed Oct. 18, 1988, Ser. No. 259,107
Term of patent 14 years
U.S. Cl. D3—100



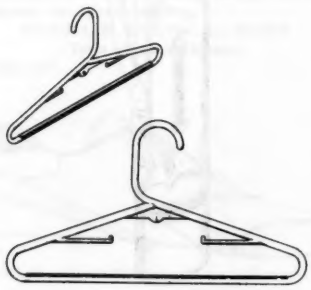
318,570
ARM BAND WITH IDENTIFICATION HOLDER OR THE LIKE
Stanley Walasek, Shavertown, Pa., assignor to Stuart Promotional Products, Inc., Nanticoke, Pa.
Filed Oct. 19, 1988, Ser. No. 259,611
Term of patent 14 years
U.S. Cl. D3—106



318,571
TOOTHBRUSH
Helge Sletbak, Trollasen, Norway, assignor to Sanodent BV, Kerkade, Netherlands
Filed Dec. 4, 1989, Ser. No. 445,331
Term of patent 14 years
U.S. Cl. D4—104

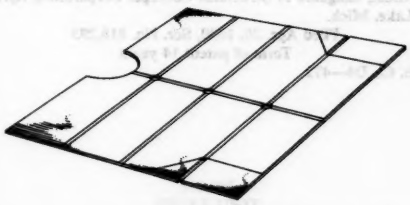
318,572
EMBOSSED TISSUE OR SIMILAR ARTICLE
Cheri L. Schultz, Appleton, Wis., and Mary M. Benton, Providence, R.I., assignors to Kimberly-Clark Corporation, Neenah, Wis.
Filed Nov. 7, 1989, Ser. No. 433,642
Term of patent 14 years
U.S. Cl. D5—53

318,573
GARMENT HANGER
Abraham Abdi, 2940 Echo Hill Way, Orange, Calif. 92667
Filed Mar. 1, 1989, Ser. No. 317,360
Term of patent 14 years
U.S. Cl. D6—317

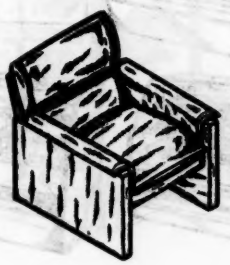


318,574
URINAL PARTITION WALL
Uli Witzig, Wolfhausen, Switzerland, assignor to Geberit AG, Jona, Switzerland
Filed Mar. 8, 1988, Ser. No. 165,673
Claims priority, application Hague, Sep. 11, 1987, DM/009282
Term of patent 14 years
U.S. Cl. D6—332

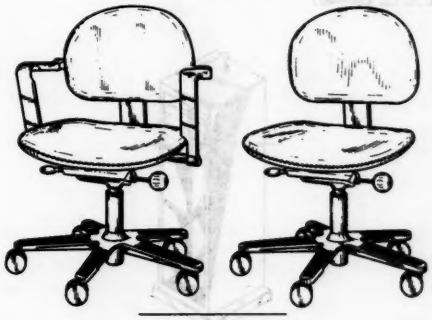
318,575
PORTABLE PLATFORM
Samuel W. Applebaum, 468 S. Roxbury Dr. #502, Beverly Hills, Calif. 90212
Filed Oct. 5, 1987, Ser. No. 105,196
Term of patent 14 years
U.S. Cl. D6—333



318,576
CHAIR
Lee H. Fister, Jr., P.O. Box 43, Centerville, Ohio 45459
Filed Feb. 17, 1988, Ser. No. 157,303
Term of patent 14 years
U.S. Cl. D6—334

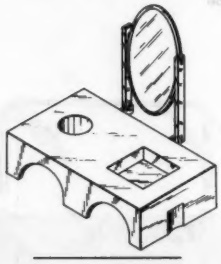


318,577
CHAIR
Donald T. Chadwick, Los Angeles, and Peter R. Glass, Capitola, both of Calif., assignors to American Seating Company, Grand Rapids, Mich.
Filed Mar. 11, 1988, Ser. No. 166,631
Term of patent 14 years
U.S. Cl. D6—366



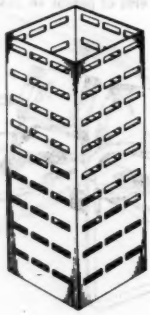
318,578
PLURAL SEATING UNIT
Roger K. Leib, 1064 Crescent Heights, Los Angeles, Calif. 90035
Division of Ser. No. 833,977, Feb. 26, 1986, abandoned. This application Jul. 24, 1986, Ser. No. 889,188
Term of patent 14 years
U.S. Cl. D6—381

318,579
PORTABLE LAP DRESSER
Barbara L. Palmer, 201 Westbrook Drive, Raleigh, N.C. 27615
Filed Jun. 21, 1989, Ser. No. 369,278
Term of patent 14 years
U.S. Cl. D6—406

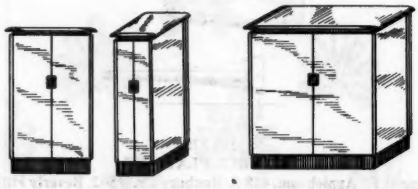


318,580
COMPACT DISC STORAGE UNIT DESIGN
Martin Sjostrom, 2286 Lake Osborne Dr., Lake Worth, Fla. 33461
Filed Feb. 16, 1988, Ser. No. 156,084
Term of patent 14 years
U.S. Cl. D6—407

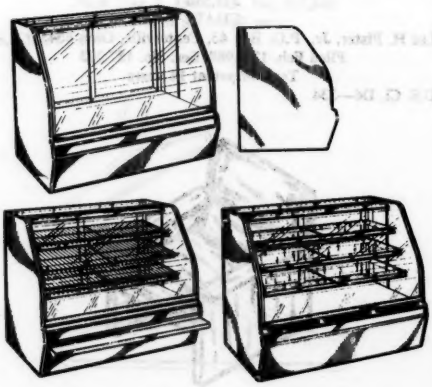
318,581
JEWELRY DISPLAY STAND
Joseph DiDomenico, 575 Mount Pleasant Ave., Providence, R.I. 02908
Filed Feb. 1, 1988, Ser. No. 152,051
Term of patent 14 years
U.S. Cl. D6—457



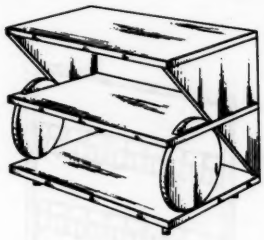
318,582
CABINET
Geoffrey A. Hollington, London, England, assignor to Herman Miller, Inc., Zeeland, Mich.
Filed Jun. 10, 1988, Ser. No. 204,779
Term of patent 14 years
U.S. Cl. D6—446



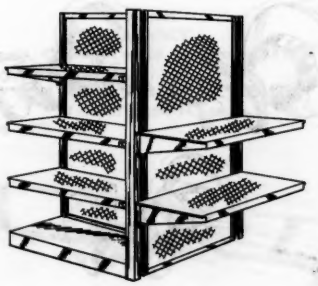
318,583
DISPLAY CASE
Robert J. Fevig; Randall S. Holleman; Rebecca A. Garrett, all of Grand Haven, and Duane L. Seaver, N. Muskegon, all of Mich., assignors to Structural Concepts Corporation, Spring Lake, Mich.
Filed Apr. 30, 1990, Ser. No. 516,293
Term of patent 14 years
U.S. Cl. D6—472



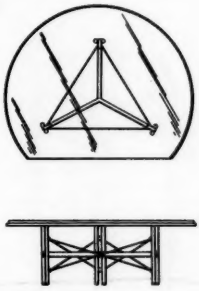
318,584
VIDEO CART
Ronald J. Rousso, 5420 W. 83rd St., Los Angeles, Calif. 90045
Filed Apr. 4, 1988, Ser. No. 177,395
Term of patent 14 years
U.S. Cl. D6—479



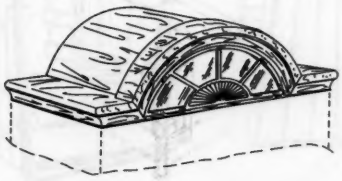
318,585
SHELF UNIT
Terry L. Duff, Seminole, and William R. Gundlach, Shawnee, both of Okla.
Filed May 13, 1987, Ser. No. 49,690
Term of patent 14 years
U.S. Cl. D6—479



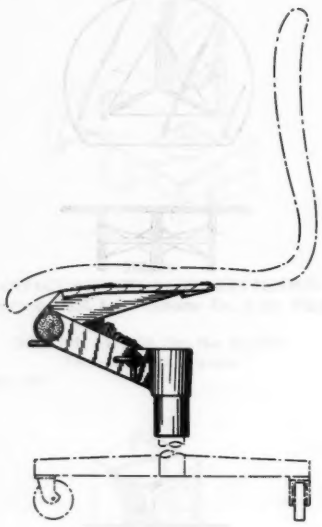
318,586
TABLE
Robert D. Kleinschmidt, Chicago, Ill., assignor to DO3 Systems, Inc., Cleveland, Ohio
Filed Aug. 24, 1987, Ser. No. 88,213
Term of patent 14 years
U.S. Cl. D6—487



318,587
FURNITURE TOP
H. Thomas Keller, High Point, N.C., assignor to Bernhardt Furniture Company, Inc., Lenoir, N.C.
Filed Jun. 13, 1988, Ser. No. 205,803
Term of patent 14 years
U.S. Cl. D6—491



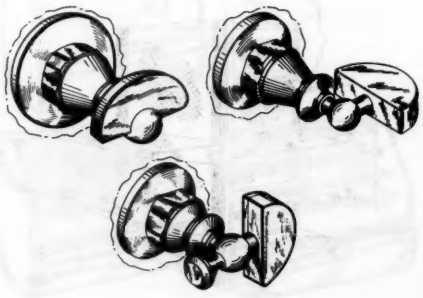
318,588
CHAIR CONTROL
Earl H. Koepke, Sturgis, Mich., assignor to Leggett & Platt, Incorporsted, Carthage, Mo.
Filed Jun. 24, 1988, Ser. No. 211,407
Term of patent 14 years
U.S. Cl. D6—500



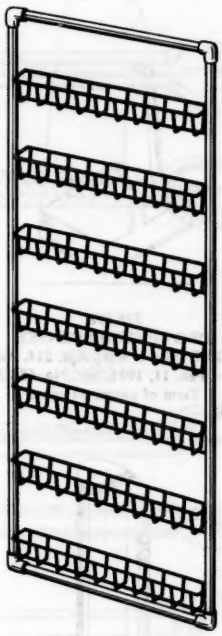
318,589
ADJUSTABLE ARM REST ATTACHMENT
Richard Szadkowski, Edmonds, Wash., assignor to Lucy Szadkowski, Mukilteo, Wash.
Division of Ser. No. 142,878, Jan. 7, 1988, Pat. No. Des. 314,106, which is a continuation-in-part of Ser. No. 897,902, Aug. 19, 1986, abandoned. This application Aug. 15, 1990, Ser. No. 567,885
Term of patent 14 years
U.S. Cl. D6—501

318,590
SUPPORT ACCESSORY
William C. McKeone, Sheboygan, Wis., assignor to Kohler Co., Kohler, Wis.
Filed Mar. 31, 1989, Ser. No. 332,668
Term of patent 14 years
U.S. Cl. D6—524



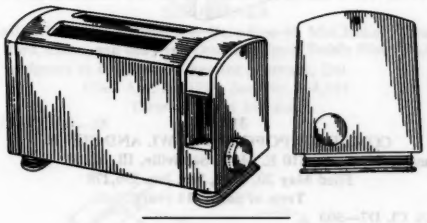


318,591
DISPLAY RACK
David A. Killiany, 4985 Skyline Dr., Cambridge, Ohio 43725
Filed May 3, 1988, Ser. No. 189,960
Term of patent 14 years
U.S. Cl. D6—566

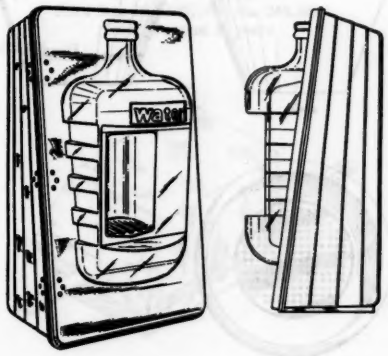


318,592
VALANCE
Charles Byrne, Oshawa, Canada, assignor to 537988 Ontario Limited, Oshawa, Canada
Filed Apr. 15, 1988, Ser. No. 182,317
Term of patent 14 years
U.S. Cl. D6—579

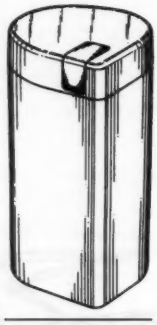
318,593
TOASTER
Lutz Gebhardt, Darmstadt, Fed. Rep. of Germany, assignor to Rowenta-Werke GmbH, Offenbach, Fed. Rep. of Germany
Filed Apr. 25, 1988, Ser. No. 185,801
Claims priority, application Fed. Rep. of Germany, Oct. 28, 1987, 5 MR 10798
Term of patent 14 years
U.S. Cl. D7—330



318,594
WATER DISPENSING CABINET
Frank D. Shaw, King City, Canada, assignor to Aquarius Water Inc., Dorval, Canada
Filed Sep. 12, 1988, Ser. No. 242,516
Claims priority, application Canada, Mar. 24, 1988, 24-03-88-6
Term of patent 14 years
U.S. Cl. D7—301

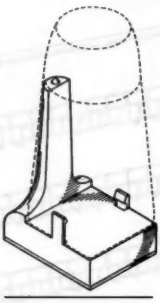


318,595
ELECTRIC COFFEE GRINDER
Dean A. Retzlaff, Campbellsport, Wis., and William C. Cesaroni, Glenview, Ill., assignors to The West Bend Company, Deerfield, Ill.
Filed Nov. 14, 1988, Ser. No. 271,190
Term of patent 14 years
U.S. Cl. D7—373

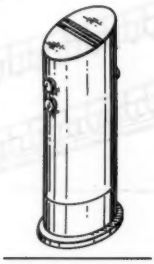


318,596
COMBINED POPCORN BOWL AND SIEVE
Charles W. Watts, 410 E. Main, Steelville, Ill. 62288
Filed May 20, 1988, Ser. No. 196,278
Term of patent 14 years
U.S. Cl. D7—505

318,597
HOLDER FOR A SPICE OR SALT DISPENSER
Sarge Schultz, Wisconsin Rapids, Wis., assignor to Aspen Industries, Inc., Edgerton, Wis.
Filed Sep. 29, 1989, Ser. No. 414,935
Term of patent 14 years
U.S. Cl. D7—590

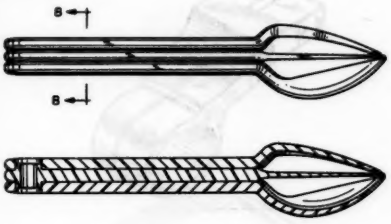


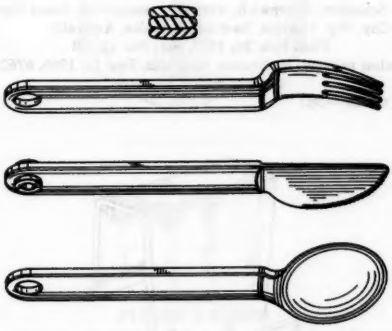
318,598
TWO SPICE DISPENSER
Harold Plough, 2000 Illinois Ave., Apt. 214, Aurora, Ill. 60506
Filed Feb. 11, 1991, Ser. No. 653,277
Term of patent 14 years
U.S. Cl. D7—590



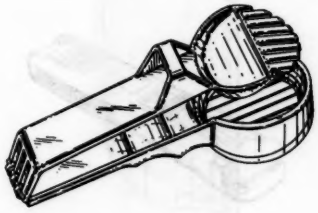
318,599
VACUUM BOTTLE
Kaori Mano, and Nobuyuki Enomoto, both of Kyoto, Japan, assignors to Japan Oxygen Co., Ltd., Japan
Filed Sep. 1, 1988, Ser. No. 239,326
Claims priority, application Japan, Mar. 4, 1988, 63-8862
Term of patent 14 years
U.S. Cl. D7—605

318,600
COMBINED KNIFE, FORK AND SPOON SET
Stig Lillelund, Gentofte; Jakob Heiberg, Copenhagen, both of Denmark, and Robert H. C. M. Daenen, Erembodegem, Belgium, assignors to Dart Industries Inc., Deerfield, Ill.
Filed May 10, 1988, Ser. No. 192,402
Term of patent 14 years
U.S. Cl. D7—643



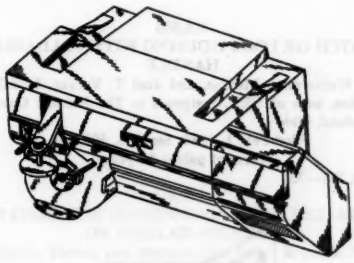


318,601
EGG SLICER
David J. Barnett, Hemel Hempstead, England, assignor to Maxpat Trading & Marketing (Far East Limited), Hong Kong
Filed May 10, 1989, Ser. No. 349,748
Claims priority, application United Kingdom, Nov. 11, 1988, 1054912
Term of patent 14 years
U.S. Cl. D7—673

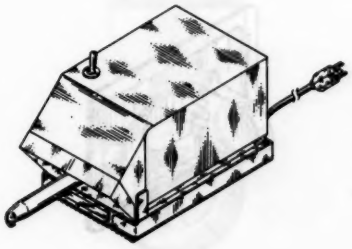


318,602
HANDLE GRIP FOR A HAND TOOL
Manuel Vosbikian, Medford, N.J., assignor to Hardware & Industrial Tool Co., Inc., Delanco, N.J.
Filed Sep. 22, 1989, Ser. No. 413,011
Term of patent 14 years
U.S. Cl. D8—10

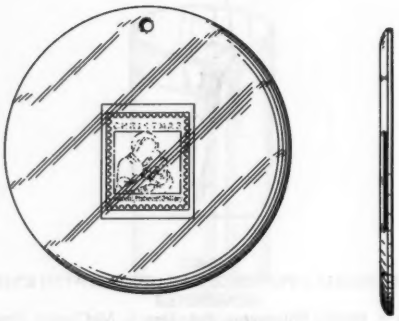
318,603
ELECTRICALLY POWERED CAN OPENER WITH KNIFE SHARPENER
Sally A. Hattle, Wilmington, Del.; Don R. McCloskey, Stratford, Conn., and Gary van Deursen, Upper Saddle River, N.J., assignors to Black & Decker Inc., Newark, Del.
Filed Apr. 26, 1989, Ser. No. 344,144
Term of patent 14 years
U.S. Cl. D8—35



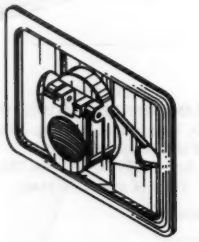
318,604
ARTIFICIAL FLOWER STEM MOUNTING MACHINE
Floyd L. Hill, P.O. Box 633, Arab, Ala. 35016, and Billy O'Neal, Box 122, Paint Rock, Ala. 35764
Filed Sep. 16, 1988, Ser. No. 245,390
Term of patent 14 years
U.S. Cl. D8—61

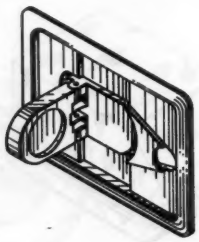


318,605
CHRISTMAS TREE ORNAMENT WITH POSTAGE STAMP
Roger W. Dudley, 6647 Kerns Rd., Falls Church, Va. 22042
Filed Apr. 21, 1988, Ser. No. 184,160
Term of patent 14 years
U.S. Cl. D11—117



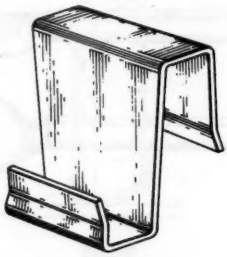
318,606
LATCH OR LOCK HOUSING WITH FOLDABLE HANDLE
Lee S. Weinerman, Medina, and Joel T. Vargus, Middleburg Heights, both of Ohio, assignors to The Eastern Company, Cleveland, Ohio
Filed Feb. 1, 1989, Ser. No. 305,010
Term of patent 14 years
U.S. Cl. D8—331



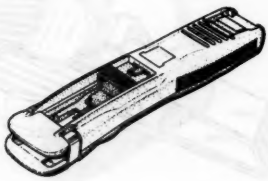


318,607
BRACKET OR THE LIKE
Mary J. Reid, and William C. McKeone, both of Sheboygan, Wis., assignors to Kohler Co., Kohler, Wis.
Filed Oct. 26, 1988, Ser. No. 263,128
Term of patent 14 years
U.S. Cl. D8—363

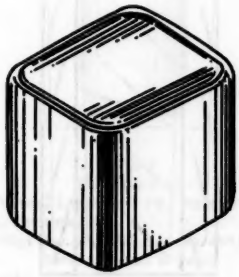
318,608
FASTENING CLIP FOR PLANKS, CLIPBOARDS, OR THE LIKE
John Schenker, Greenwich, Australia, assignor to James Hardie & Coy. Pty. Limited, New South Wales, Australia
Filed Feb. 24, 1987, Ser. No. 18,068
Claims priority, application Australia, Sep. 17, 1986, 6762/86
Term of patent 14 years
U.S. Cl. D8—382



318,609
CLIP DRIVER
Hisao Sato, Daini-Hikariso, 10, Toyotamaminami 3-Chome, Nerima-Ku, Tokyo, Japan
Filed Mar. 21, 1989, Ser. No. 326,842
Claims priority, application Japan, Oct. 14, 1988, 63-40240
Term of patent 14 years
U.S. Cl. D8—49



318,610
AEROSOL CONTAINER
Tomio Nitta, Yokohama, Japan, assignor to Tokai Corporation, Yokohama, Japan
Filed May 20, 1988, Ser. No. 196,401
Claims priority, application Japan, Nov. 28, 1987, 62-48518
The portion of the term of this patent subsequent to Oct. 3, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D9—300

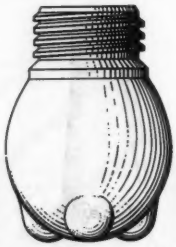


318,611
FLEXIBLE POUCH
Adam Sherman, Brooklyn, N.Y., assignor to Colgate-Palmolive Company, Piscataway, N.J.
Filed Mar. 23, 1989, Ser. No. 328,349
Term of patent 14 years
U.S. Cl. D9—305

318,612
BOTTLE
Robert H. Brooks, 118 Morning Rd., Fayetteville, Ga. 30214
Filed Dec. 1, 1988, Ser. No. 278,432
Term of patent 14 years
U.S. Cl. D9—335

318,613
CONTAINER FOR DISPENSING LIQUID DETERGENT OR SIMILAR ARTICLE
Hans Halm, Herne, and Herbert Buecheler, Erkrath, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf-Holthausen, Fed. Rep. of Germany
Filed Jan. 19, 1989, Ser. No. 299,843
Claims priority, application World Int. Prop. O., Jul. 19, 1988, DMA/000808
Term of patent 14 years
U.S. Cl. D9—366

318,614
BOTTLE OR SIMILAR ARTICLE
Michael Sheridan, Old Bridge, N.J., assignor to Ethylene Corp., Murray Hill, N.J.
Filed Aug. 2, 1989, Ser. No. 388,349
Term of patent 14 years
U.S. Cl. 91—370



318,615
BOTTLE
John Martin, Caledonia, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.
Filed Nov. 8, 1989, Ser. No. 434,054
Term of patent 14 years
U.S. Cl. D9—376

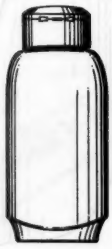
318,616

Patent Not Issued For This Number

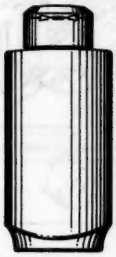
318,617
FRAGRANCE BOTTLE
Tobia Scarpa, and Afra B. Scarpa, both of Trevignano, Italy, assignors to Benetton Group S.p.A., Ponzano Veneto, Italy
Filed Aug. 28, 1987, Ser. No. 91,041
Claims priority, application Italy, Feb. 26, 1987, 20963/87[U]
Term of patent 14 years
U.S. Cl. D9—400

318,618
FRAGRANCE BOTTLE
Tobia Scarpa, and Afra B. Scarpa, both of Trevignano, Italy, assignors to Benetton Group S.p.A., Ponzano Veneto, Italy
Filed Aug. 19, 1987, Ser. No. 87,248
Claims priority, application Italy, Feb. 26, 1987, 20961/87[U]
Term of patent 14 years
U.S. Cl. D9—400

318,619
COMBINED BOTTLE AND CAP
Stuart R. Kipperman, Easton, Conn., and Myron Smith, Mohegan Lake, N.Y., assignors to Chesebrough-Pond's USA Co. (division of Conopco, Inc.), Greenwich, Conn.
Filed Apr. 17, 1989, Ser. No. 339,420
The portion of the term of this patent subsequent to Jul. 9, 2005, has been disclaimed.
Term of patent 14 years
U.S. Cl. D9—403



318,620
COMBINED BOTTLE AND CAP
Stuart R. Kipperman, Easton, Conn., and Myron Smith, Mohegan Lake, N.Y., assignors to Chesebrough-Pond's USA Co. (Conopco, Inc.), Greenwich, Conn.
Filed Apr. 17, 1989, Ser. No. 339,421
The portion of the term of this patent subsequent to Jul. 9, 2005, has been disclaimed.
Term of patent 14 years
U.S. Cl. D9—403

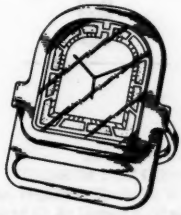


318,621
BOTTLE CAP
Clarence J. Venne, Langhorne, Pa., assignor to Clarence J. Venne, Inc., Levittown, Pa.
Filed Dec. 20, 1989, Ser. No. 454,865
Term of patent 14 years
U.S. Cl. D9—453

318,622
CLOCK
Mitsuo Wada, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan
Filed Sep. 19, 1988, Ser. No. 246,528
Claims priority, application Japan, Apr. 22, 1988, 16421
Term of patent 14 years
U.S. Cl. D10—15

318,623
CLOCK
Hisako Sugano, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan
Filed Sep. 14, 1988, Ser. No. 244,245
Claims priority, application Japan, Mar. 15, 1988, 63-10456
Term of patent 14 years
U.S. Cl. D10—21

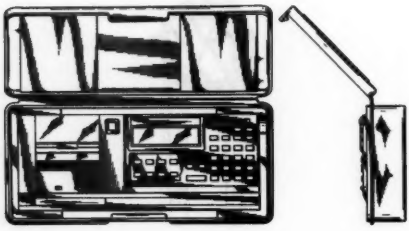
318,624
CLOCK
Jean-Louis Dumas, Paris, France, assignor to La Montre Hermes, S.A., Switzerland
Filed May 9, 1988, Ser. No. 191,482
Term of patent 14 years
U.S. Cl. D10—28



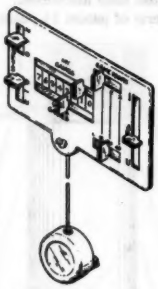
318,625
DIVOT WATCH
Valerie G. Stowell, 510 Westford St., Anaheim, Calif. 92807
Filed Jul. 7, 1988, Ser. No. 216,257
Term of patent 14 years
U.S. Cl. D10—31

318,626
WRIST WATCH
Severin S. Wunderman, Laguna Beach, Calif., assignor to Severin Montres AG, Zug, Switzerland
Filed Jun. 1, 1987, Ser. No. 57,156
Claims priority, application Int'l Pat. Institute, Dec. 22, 1986, DMA/000 574
Term of patent 14 years
U.S. Cl. D10—32

318,627
ROTATING EQUIPMENT ALIGNMENT ANALYSIS INSTRUMENT
Richard W. Frederick, 2007 Pebble Beach, Richardson, Tex. 75082
Filed Aug. 14, 1989, Ser. No. 393,755
Term of patent 14 years
U.S. Cl. D10—46

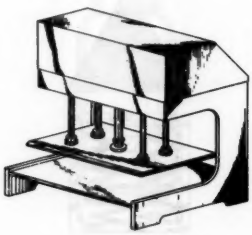


318,628
TENNIS SCORE KEEPER
N. O. Ralston, 1223 Lamar, Amarillo, Tex. 79102
Filed Sep. 26, 1988, Ser. No. 249,967
Term of patent 14 years
U.S. Cl. D10—46.1

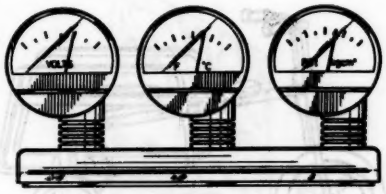


318,629
LUMBAR INTERBODY GAUGE
Gary K. Michelson, 438 Sherman Canal, Venice, Calif. 90291
Filed Nov. 16, 1987, Ser. No. 121,704
Term of patent 14 years
U.S. Cl. D10—64

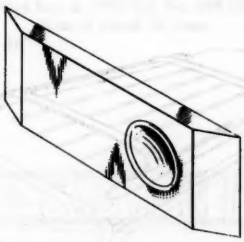
318,630
PRINTED CIRCUIT BOARD TESTER
Jung-Chao Lee, 5F, No. 12, Lane 90, Sec. 2, Chung Sueng Street, Micha, Taipei, Taiwan
Filed Jan. 9, 1989, Ser. No. 294,814
Term of patent 14 years
U.S. Cl. D10—75



318,631
VEHICLE GAUGE
Shinichi Asano, Tokyo, Japan, assignor to Car Mate Manufacturing Company Limited, Tokyo, Japan
Filed Jul. 22, 1988, Ser. No. 224,533
Term of patent 14 years
U.S. Cl. D10—102

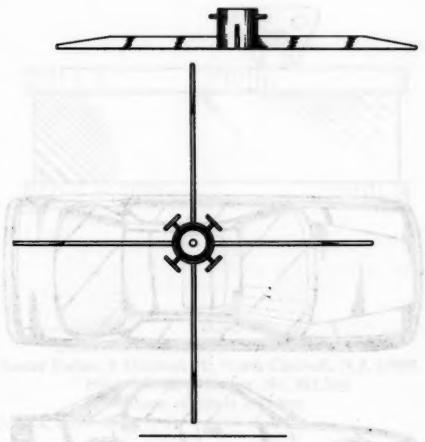


318,632
CALL BUTTON INDICATOR AND WALL PLATE FOR ELEVATORS
Richard R. Polacek, Simsbury, and Jean Youla, Hartford, both of Conn., assignors to Otis Elevator Company, Farmington, Conn.
Filed May 4, 1989, Ser. No. 348,731
Term of patent 14 years
U.S. Cl. D10—108

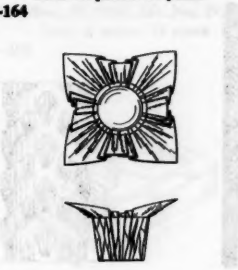


318,633
BROOCH
Gloria E. Das, 505 Cativo Dr., Atlanta, Ga. 30311
Division of Ser. No. 92,713, Sep. 3, 1987, Pat. No. Des. 311,154.
This application Jul. 11, 1990, Ser. No. 551,751
Term of patent 14 years
U.S. Cl. D11—86

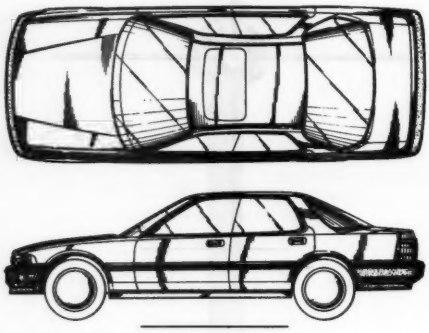
318,634
CHRISTMAS TREE STAND
Thomas A. Tobin, 434 Evergreen Sq., Port Hueneme, Calif. 93041
Filed Apr. 17, 1989, Ser. No. 338,761
Term of patent 14 years
U.S. Cl. D11—130.1



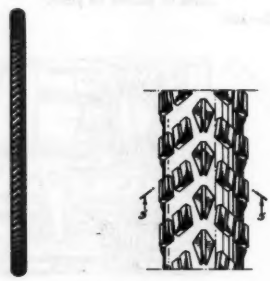
318,635
FLOWER POT COVER
Donald E. Weder, Highland; Erwin H. Weder, deceased, late of Highland, both of Ill. by Donald E. Weder, Wanda M. Weder, co-executors; Wanda M. Weder, Highland, Calif.; Franklin J. Craig, Valley Park, Mo.; Wilma M. Donnelly, Highland, Ill.; Phyllis J. Bolk, Highland, Ill.; John W. Bergstrand, Highland, Ill., and Robert C. Abrams, Edwardsville, Ill., assignors to Highland Supply Corporation, Highland, Ill.
Continuation-in-part of Ser. No. 613,053, May 22, 1984, Pat. No. D. 293,224. This application Dec. 3, 1987, Ser. No. 128,543
The portion of the term of this patent subsequent to Apr. 2, 2005, has been disclaimed.
Term of patent 14 years
U.S. Cl. D11—164



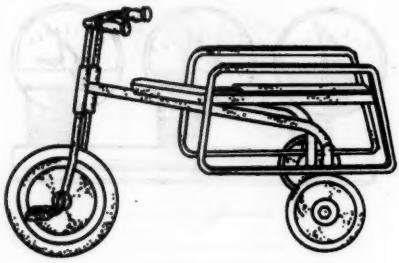
318,636
AUTOMOBILE
Akira Shimoyama, Saitama; Kazuyuki Tairabune, Fujimi, and Hiroyuki Kawase, Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Jun. 16, 1989, Ser. No. 367,491
Claims priority, application Japan, Dec. 16, 1988, D63-49082
Term of patent 14 years
U.S. Cl. D12—92



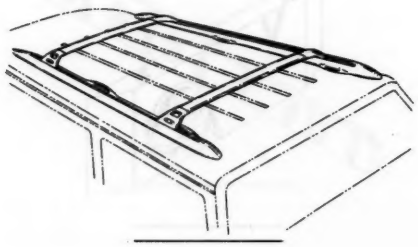
318,637
BICYCLE TIRE
Kohei Marui, Kobe, Japan, assignor to Marui Ltd., Kobe, Japan
Filed Sep. 20, 1988, Ser. No. 247,103
Term of patent 14 years
U.S. Cl. D12—136



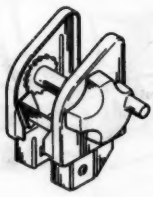
318,638
TRICYCLE
Ray G. Kelly, County of St. Louis, Mo., assignor to Angeles Nursery Toys Inc., Pacific, Mo.
Division of Ser. No. 387,120, Jul. 31, 1989, which is a division of Ser. No. 131,522, Dec. 11, 1987, Pat. No. Des. 304,813. This application Feb. 20, 1990, Ser. No. 482,666
Term of patent 14 years
U.S. Cl. D12—112



318,639
VEHICLE LUGGAGE RACK
Michael Santoro, 572 Henrietta St., Birmingham, Mich. 48009, and Darrel L. Morley, 1634 Hillside La., Rochester, Mich. 48063
Filed Dec. 1, 1989, Ser. No. 444,220
Term of patent 14 years
U.S. Cl. D12—157



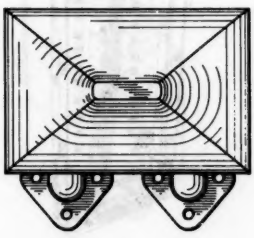
318,640
BAND STRETCHER FOR CARTOP CARRIERS
Jan Wärnelöv, Villa Nord, Töras, S-334 00, Sweden
Filed Mar. 8, 1989, Ser. No. 320,430
Term of patent 14 years
U.S. Cl. D12—157



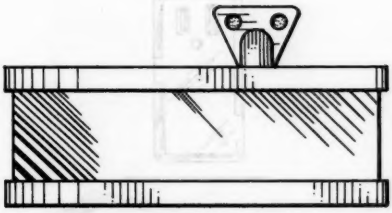
318,641
AUXILARY ARTICLE CARRIER FOR A TRUCK BED STORAGE COMPARTMENT
Robert W. Schwartz, Rte. 2, Box 40, Burnet, Tex. 78611
Filed May 22, 1989, Ser. No. 355,394
Term of patent 14 years
U.S. Cl. D12—157

318,642
SCRATCH GUARD FOR AUTOMOBILE DOORS
William W. Gaither, 4031 Postgate Ter., Apt. 102, Silver Spring, Md. 20906
Filed Sep. 2, 1988, Ser. No. 240,221
Term of patent 14 years
U.S. Cl. D12—167

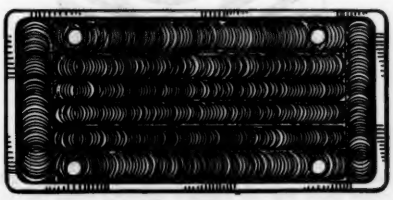
318,643
TRUCK AIR DEFLECTOR
Daniel G. Judson, 7 Pleasant Ct., Waterville, Me. 04901
Filed Oct. 12, 1989, Ser. No. 420,221
Term of patent 14 years
U.S. Cl. D12—181



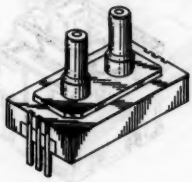
318,644
BLIND SPOT MIRROR
Nemorio A. Rodrigues, P.O. Box 63, R.R. 1, Peru, Ill. 61354, and Tammy Anderson, 413 E. St. Paul, Spring Valley, Ill. 61362
Filed Aug. 16, 1989, Ser. No. 394,515
Term of patent 14 years
U.S. Cl. D12—187



318,645
LICENSE PLATE MOUNTING SUPPORT
Chester Farber, 8 Hillcrest Pl., North Caldwell, N.J. 07006
Filed Jul. 18, 1989, Ser. No. 381,514
Term of patent 14 years
U.S. Cl. D12—193



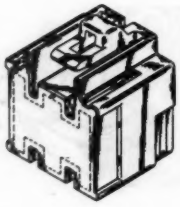
318,646
DIFFERENTIAL PRESSURE TRANSDUCER
Said Karbassi, Monroe, Wis., assignor to Honeywell Inc., Minneapolis, Minn.
Filed Dec. 30, 1988, Ser. No. 292,576
Term of patent 14 years
U.S. Cl. D13—101



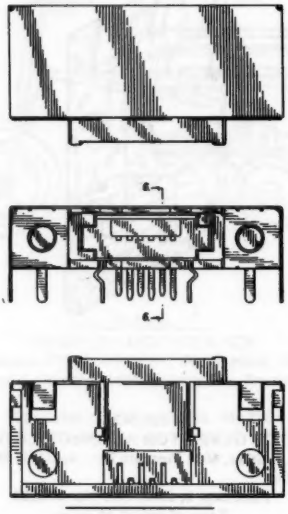
318,647
GROUNDED ELECTRIC PLUG ADAPTER
Richard A. Dunn, Sr., 1905 Gulf Way, St. Petersburg Beach, Fla. 33706
Filed Oct. 26, 1988, Ser. No. 262,675
Term of patent 14 years
U.S. Cl. D13—143

318,648
CIGARETTE LIGHTER ADAPTOR
Herbert Collins, 547 E. 148th St., Harvey, Ill. 60426
Filed Nov. 5, 1990, Ser. No. 608,883
Term of patent 14 years
U.S. Cl. D13—144

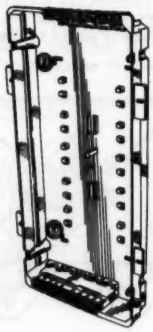
318,649
HOUSING FOR ELECTRICAL CONNECTOR
Yasuhiro Nagasaka; Yasuo Hirayama, both of Toyota; Shigekazu Wakata; Shinichi Yamada, both of Yokkaichi, and Yoshihiro Tanaka, Mie, all of Japan, assignors to Sumitomo Wiring Systems, Ltd., Yokkaichi, Japan
Filed Apr. 18, 1989, Ser. No. 339,633
Claims priority, application Japan, Oct. 20, 1988, 63-41164
Term of patent 14 years
U.S. Cl. D13—147



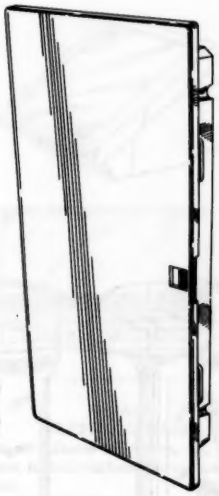
318,650
ELECTRICAL CONNECTOR RECEPTACLE FOR A PRINTED CIRCUIT BOARD
Shuichi Matsuzaki, Tokyo, Japan, assignor to Hirose Electric Co., Ltd., Tokyo, Japan
Filed Jan. 11, 1989, Ser. No. 299,823
Claims priority, application Japan, Jul. 11, 1988, 63-27584
Term of patent 14 years
U.S. Cl. D13—147



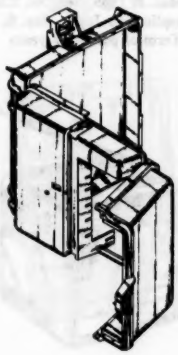
318,651
HOUSING FOR AN ELECTRICAL LOAD CENTER
Jeffrey O. Sharp, Lexington; Ronald H. Reed, Versailles; Terrance A. Cassity, Paris, all of Ky.; Ronald W. Chaffin, Lafayette, Ind., and Frank R. Wilgus, Powell, Ohio, assignors to Square D Company, Palatine, Ill.
Filed Jul. 19, 1989, Ser. No. 382,808
Term of patent 14 years
U.S. Cl. D13—160



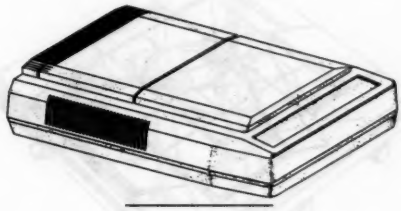
318,652
ELECTRICAL LOAD CENTER ENCLOSURE
Jeffery J. Buchanan, Lexington, Ky., assignor to Square D Company, Palatine, Ill.
Filed Jul. 19, 1989, Ser. No. 382,809
Term of patent 14 years
U.S. Cl. D13—160



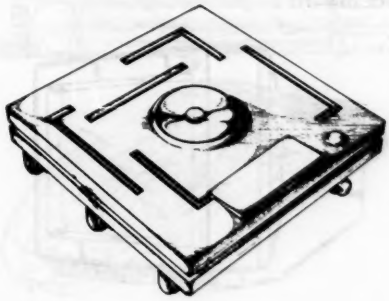
318,653
SUBSCRIBER NETWORK INTERFACE ENCLOSURE
Anthony L. Nieves, Bradley Beach, and Thomas J. Collins, Wall, both of N.J., assignors to Keptel, Inc., Tinton Falls, N.J.
Filed May 15, 1989, Ser. No. 351,814
Term of patent 14 years
U.S. Cl. D13—184



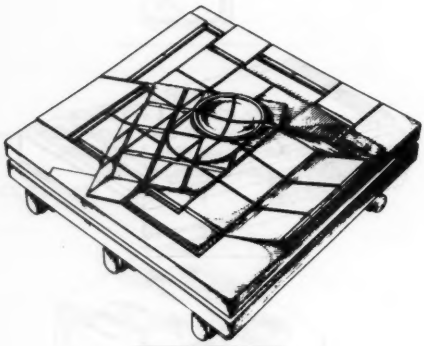
318,654
IMAGE SCANNER
Don-Shih Huang, Hsinchu, Taiwan, assignor to UMAX Data System, Inc., Taiwan
Filed Feb. 13, 1989, Ser. No. 309,364
Term of patent 14 years
U.S. Cl. D14—107



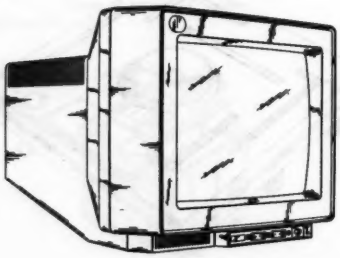
318,655
DATA COMMUNICATIONS PERIPHERAL
Frank Bowker, Lawrenceville; Samuel W. Harris, Norcross, both of Ga.; David Gresham, Chicago, Ill., and Mark Hicks, Norcross, Ga., assignors to Hayes Microcomputer Products, Inc., Norcross, Ga.
Filed Jul. 27, 1989, Ser. No. 386,492
Term of patent 14 years
U.S. Cl. D14—107



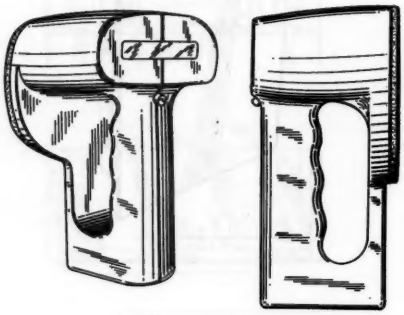
318,656
DATA COMMUNICATIONS PERIPHERAL
Frank Bowker, Lawrenceville; Samuel Harris, Norcross, both of Ga.; David Gresham, Chicago, Ill., and Mark Hicks, Norcross, Ga., assignors to Hayes Microcomputer Products, Inc., Norcross, Ga.
Continuation-in-part of Ser. No. 386,854, Jul. 27, 1989, abandoned. This application Nov. 13, 1989, Ser. No. 434,129
Term of patent 14 years
U.S. Cl. D14—107



318,657
DISPLAY FOR COMPUTER
John A. Wiseman, Winchester, England, assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Aug. 30, 1989, Ser. No. 400,895
Claims priority, application United Kingdom, Mar. 9, 1989, 1057862
Term of patent 14 years
U.S. Cl. D14—113

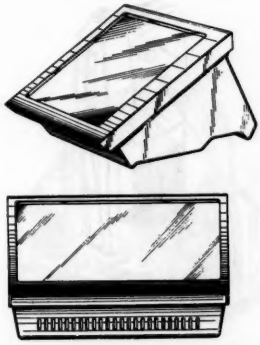


318,658
IDENTITY TAG READER
Hannis L. Stoddard, III, Norco; Douglas E. Hull, Mission Viejo, both of Calif.; George Schmidt, Douglaston, N.Y.; Lester Brown, Flushing, N.Y., and Michael L. Beigel, New York, N.Y., assignors to Avid, Inc., Norco, Calif.
Filed Feb. 16, 1990, Ser. No. 482,394
Term of patent 14 years
U.S. Cl. D14—116

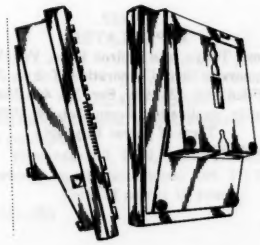


318,659
TELEVISION RECEIVER
Akira Yamazaki, Niza, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed Mar. 8, 1989, Ser. No. 320,931
Claims priority, application Japan, Sep. 8, 1988, 63-35574
Term of patent 14 years
U.S. Cl. D14—126

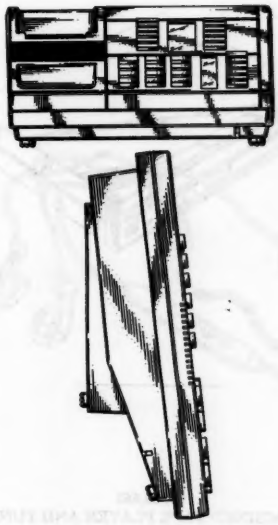
318,660
MULTI-LINE TELEPHONE MODULE FOR A TELEPHONE CONTROL PANEL
Edward W. Weber, Norwalk, Conn., assignor to Contel IPC, Inc., Stamford, Conn.
Filed Jun. 23, 1988, Ser. No. 211,400
Term of patent 14 years
U.S. Cl. D14—142



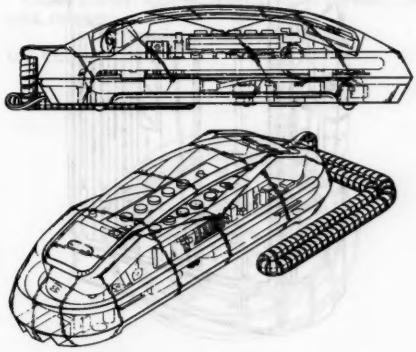
318,661
TELEPHONE BASE
Jerry W. Fuqua, and James M. Sharp, Jr., both of Corinth, Miss., assignors to International Telecommunication Corp., Memphis, Tenn.
Filed Jul. 16, 1990, Ser. No. 553,944
Term of patent 14 years
U.S. Cl. D14—151



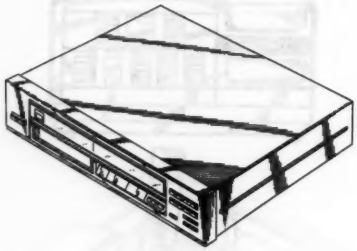
318,662
TELEPHONE BASE
Jerry W. Fuqua, and James M. Sharp, Jr., both of Corinth, Miss., assignors to International Telecommunication Corp., Memphis, Tenn.
Filed Jul. 16, 1990, Ser. No. 553,946
Term of patent 14 years
U.S. Cl. D14—151



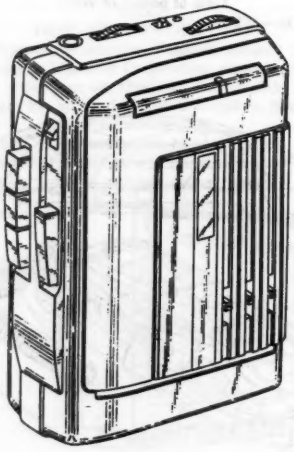
318,663
TELEPHONE SET
Kim D. Frisinger, Hong Kong, Hong Kong, assignor to Cicena Ltd., Central, Hong Kong
Filed Nov. 3, 1989, Ser. No. 431,861
Claims priority, application United Kingdom, May 4, 1989, 1059207
Term of patent 14 years
U.S. Cl. D14—151



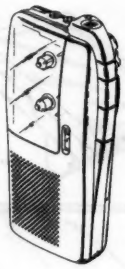
318,664
DIGITAL AUDIO DISC PLAYER
Masafumi Ito, Tokyo; Shigeru Hasegawa, Kodaira, and Minoru Sube, Hachioji, all of Japan, assignors to Teac Corporation, Tokyo, Japan
Filed Jul. 25, 1988, Ser. No. 224,799
Claims priority, application Japan, Mar. 16, 1988, 63-10654
Term of patent 14 years
U.S. Cl. D14—156



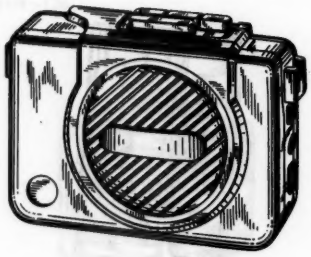
318,665
COMBINED TAPE PLAYER AND TUNER
Masafumi Ito, Tokyo; Shigeru Hasegawa, Kodaira; Minoru Sube, Hachioji; Hiroyuki Watanabe, Hanno; Keiji Tsunoda; Manami Fujino, both of Kokubunji, and Yukio Iikura, Asaka, all of Japan, assignors to TEAC Corporation, Japan
Filed Jul. 31, 1989, Ser. No. 387,634
Claims priority, application Japan, Feb. 1, 1989, 1-3418
Term of patent 14 years
U.S. Cl. D14—163



318,666
TAPE RECORDER
Akinori Mitsuse, Tama, Japan, assignor to Olympus Optical Co., Ltd., Japan
Filed Sep. 29, 1989, Ser. No. 415,183
Claims priority, application Japan, Mar. 29, 1989, 1-11610
Term of patent 14 years
U.S. Cl. D14—165



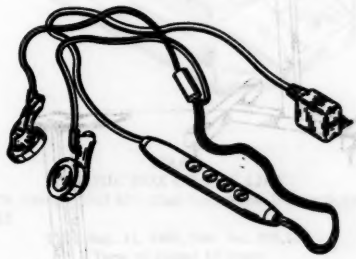
318,667
TAPE PLAYER
Etsuro Ikeyama, Tokyo, and Ichiroh Hino, Yokohama, both of Japan, assignors to Sony Corporation, Tokyo, Japan
Filed Oct. 13, 1989, Ser. No. 421,386
Claims priority, application Japan, Jul. 29, 1989, 1-28166
Term of patent 14 years
U.S. Cl. D14—165



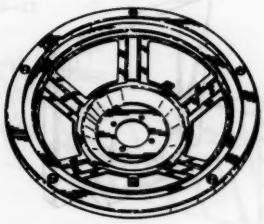
318,668
COMBINED RADIO AND LIGHT
Silvana Hervatin, 25 Plantation Road, The Peak, Hong Kong, Hong Kong
Filed Nov. 30, 1988, Ser. No. 278,073
Claims priority, application United Kingdom, Jun. 1, 1988, 1051085
Term of patent 14 years
U.S. Cl. D14—168

318,669
HEADPHONE
Takao Nakayama, Kawasaki, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed Mar. 17, 1989, Ser. No. 324,638
Claims priority, application Japan, Oct. 17, 1988, 63-40596
Term of patent 14 years
U.S. Cl. D14—205

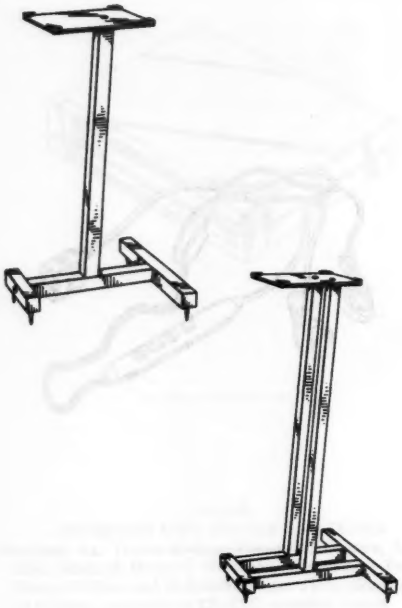
318,670
COMBINED EARPHONE AND REMOTE CONTROLLER
Shuhei Taniguchi, Yokohama, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed Apr. 14, 1989, Ser. No. 337,546
Claims priority, application Japan, Nov. 29, 1988, 63-46478
Term of patent 14 years
U.S. Cl. D14—205



318,671
LOUDSPEAKER BASKET
Gerd Naumann, Solingen, Fed. Rep. of Germany, assignor to Visaton Peter Schukat, Haan, Fed. Rep. of Germany
Filed Jan. 27, 1989, Ser. No. 302,523
Claims priority, application Fed. Rep. of Germany, Jul. 27, 1988, 8800530
Term of patent 14 years
U.S. Cl. D14—224

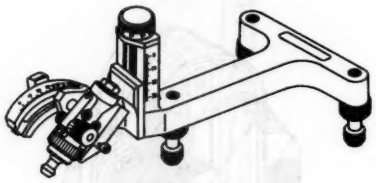


318,672
LOUDSPEAKER STAND
Ron Derain, 73 Galaxy Boulevard, Unit 7, Rexdale, Ontario M9W 5T4, Canada
Filed Mar. 23, 1988, Ser. No. 171,938
Term of patent 14 years
U.S. Cl. D14—224

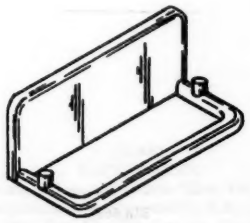


318,673
ANTENNA
Neil Terk, Pleasantville, N.Y., assignor to Terk Technologies Corporation, Syosset, N.Y.
Filed Jun. 9, 1989, Ser. No. 363,946
Term of patent 14 years
U.S. Cl. D14—230

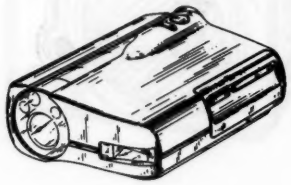
318,674
FACETER
Takahiro Imahashi, 3-21-25, Higashi-Motomachi, Kokubunji, Tokyo, Japan
Filed Jun. 15, 1988, Ser. No. 206,738
Claims priority, application Japan, Apr. 5, 1988, 63-13628
Term of patent 14 years
U.S. Cl. D15—140



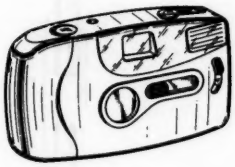
318,675
EYEGLASS HOLDER
Allan W. Ferdi, 2207 Zollinger Rd., Columbus, Ohio 43221
Filed Sep. 19, 1988, Ser. No. 245,535
Term of patent 14 years
U.S. Cl. D16—129



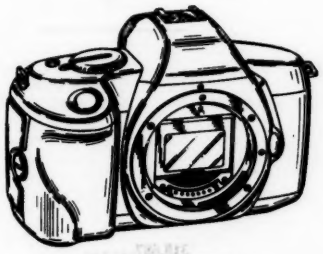
318,676
ELECTRONIC STILL CAMERA
Hiroshi Imai, and Shosaku Kawashima, both of Hachioji, Japan, assignors to Olympus Optical Co., Ltd., Japan
Filed Sep. 20, 1988, Ser. No. 247,119
Term of patent 14 years
U.S. Cl. D16—202



318,677
CAMERA
Kazuhisa Horikiri, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan
Filed Jan. 11, 1989, Ser. No. 296,735
Claims priority, application Japan, Jul. 11, 1988, 63-27631
Term of patent 14 years
U.S. Cl. D16—209

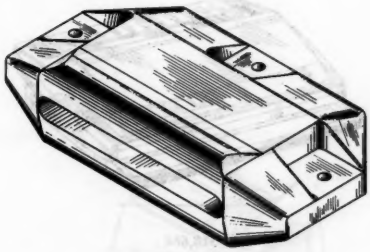


318,678
SINGLE-LENS REFLEX CAMERA BODY
Noboru Tanaka, Kawasaki, and Yoichi Tosaka, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Jan. 12, 1989, Ser. No. 296,045
Claims priority, application Japan, Jul. 12, 1988, 63-27951
Term of patent 14 years
U.S. Cl. D16—217

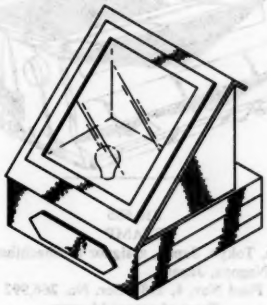


318,679
ELECTRONIC FLASH
Noboru Tanaka, Kawasaki, and Masaaki Yoshida, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Jan. 12, 1989, Ser. No. 296,038
Claims priority, application Japan, Jul. 12, 1988, 63-27953
Term of patent 14 years
U.S. Cl. D16—239

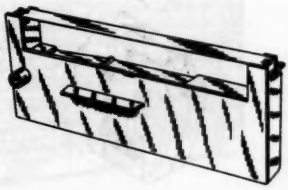
318,680
PERCUSSION INSTRUMENT
Wayne E. Cohen, Emerson, and Donald M. Kralik, Elmwood Park, both of N.J., assignors to Latin Percussion, Garfield, N.J.
Filed Nov. 14, 1988, Ser. No. 271,081
Term of patent 14 years
U.S. Cl. D17—22



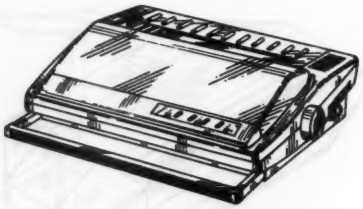
318,681
MUSIC BOX OR THE LIKE
Corey N. Savage, 2905 SW. 22nd Ave., #204, Delray Beach, Fla. 33445
Filed Sep. 11, 1986, Ser. No. 906,185
Term of patent 14 years
U.S. Cl. D17—24



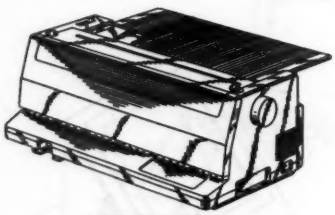
318,682
INK RIBBON CASSETTE FOR A PRINTER
Katsuhisa Gokita, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan
Filed Mar. 23, 1988, Ser. No. 172,124
Claims priority, application Japan, Oct. 15, 1987, 62-42114
Term of patent 14 years
U.S. Cl. D18—12



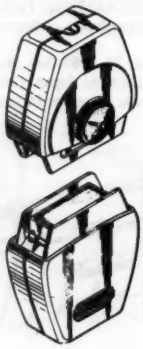
318,683
PRINTER FOR ELECTRONIC COMPUTER
Kenzo Izaki, Chiba, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Aug. 29, 1988, Ser. No. 237,573
Claims priority, application Japan, Feb. 29, 1988, 63-7833
Term of patent 14 years
U.S. Cl. D18—13



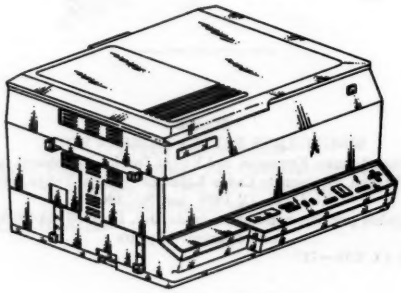
318,684
PRINTER
Toru Irie; Yoshinori Kakiuchi, and Shinichiro Imamura, all of Kawasaki, Japan, assignors to Fujitsu Limited, Kanagawa, Japan
Filed Jan. 22, 1990, Ser. No. 468,801
Claims priority, application Japan, Jul. 24, 1989, 01-27219
Term of patent 14 years
U.S. Cl. D18—13



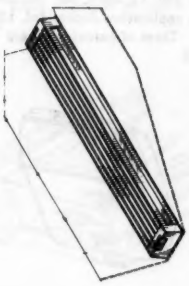
318,685
STAMP
Masaki Kida, Tokyo, Japan, assignor to Shachihata Industrial Co., Ltd., Nagoya, Japan
Filed Nov. 4, 1988, Ser. No. 266,992
Term of patent 14 years
U.S. Cl. D18—15



318,686
COMPACT COPIER AND PRINTER
David R. Gotham, Rochester; William H. Bruce, Jr., Walworth, and Gary A. Porter, Webster, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.
Filed May 8, 1989, Ser. No. 348,936
Term of patent 14 years
U.S. Cl. D18—36

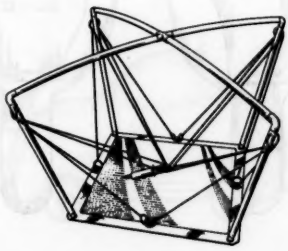


318,687
MAGAZINE BINDER
Charles A. Beck, 2815 Monterey Ave., Costa Mesa, Calif. 91626
Filed Oct. 13, 1988, Ser. No. 257,235
The portion of the term of this patent subsequent to Aug. 28, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D19—32



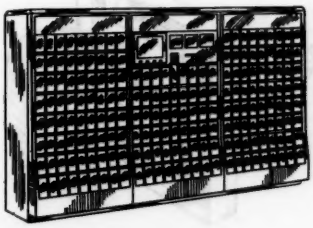
318,688
WRITING INSTRUMENT
Pierre Regnault, Valence, France, assignor to Etablissements Regnault, Valence, France
Filed Sep. 26, 1988, Ser. No. 249,095
Term of patent 14 years
U.S. Cl. D19—48

318,689
LEARNING APPARATUS FOR EVALUATING AND DEVELOPING HUMAN RESOURCE AND ORGANIZATIONAL SKILLS
Boyd G. Watkins, San Francisco, Calif., assignor to Interel, Inc., San Francisco, Calif.
Filed Jul. 27, 1988, Ser. No. 224,923
Term of patent 14 years
U.S. Cl. D19—64

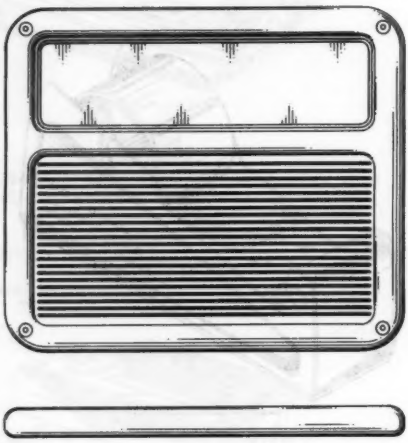


318,690
TAPE DISPENSER
Harrison Huang, No. 23, Lin Tsuo Rd., Shenkang, Taichung, Taiwan
Filed Sep. 28, 1988, Ser. No. 250,813
Term of patent 14 years
U.S. Cl. D19—69

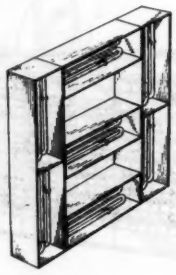
318,691
VIDEOCASSETTE VENDING MACHINE
Frank P. Ryason, La Jolla, Calif., assignor to Sam Crivello, San Diego, Calif.
Filed Jul. 18, 1988, Ser. No. 220,830
Term of patent 14 years
U.S. Cl. D20—4



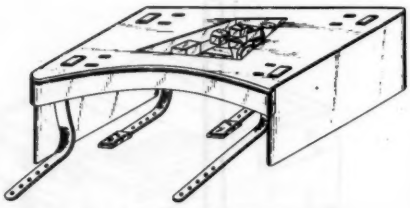
318,692
SHUTTER SIGN
James Hofman, Lake Bluff, Ill., assignor to Eldon Industries, Inc., Inglewood, Calif.
Filed Sep. 6, 1989, Ser. No. 401,657
Term of patent 14 years
U.S. Cl. D20—10



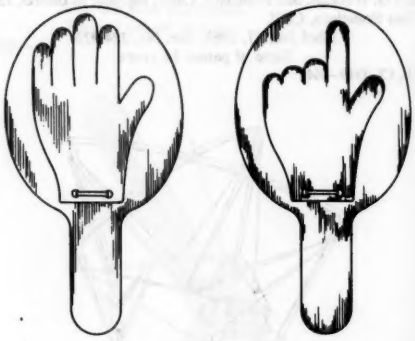
318,693
DISPLAY SIGN
Don Bezek, LaGrange, Ill., assignor to Kazor Systems, Inc., LaGrange, Ill.
Filed Oct. 13, 1989, Ser. No. 420,999
Term of patent 14 years
U.S. Cl. D20—10



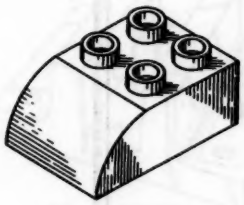
318,694
PORTABLE PLAY SURFACE DEVICE
Theresa Richards-Butts, 1927 Pendleton St., Savannah, Ga. 31405
Filed Sep. 12, 1988, Ser. No. 242,514
Term of patent 14 years
U.S. Cl. D21—59



318,695
CLAPPING NOISEMAKER
John Rosa, 12823 Golden Tee La., Houston, Tex. 77099
Filed Feb. 6, 1989, Ser. No. 306,151
Term of patent 14 years
U.S. Cl. D21—65

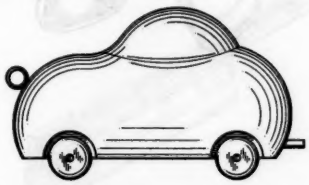


318,696
TOY BUILDING ELEMENT
Charlotte K. Hoyer, Charlottenlund, and Berit Holmstrom, Roskilde, both of Denmark, assignors to Interlego A.G., Switzerland
Filed May 9, 1989, Ser. No. 349,346
Term of patent 14 years
U.S. Cl. D21—108

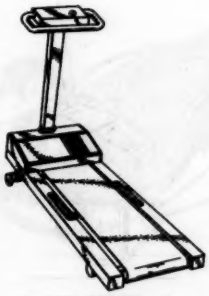


318,697
SAND PAIL TOY OR THE LIKE
Douglas M. Laib, Blackstone, Mass., and Patrick W. Brown, North Olmsted, Ohio, assignors to Dart Industries Inc., Deerfield, Ill.
Filed Mar. 3, 1989, Ser. No. 319,510
Term of patent 14 years
U.S. Cl. D21—120

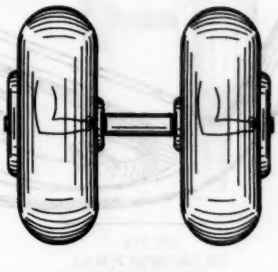
318,698
TOY CAR
Charles Roann, P.O. Box 524, Monticello, Fla. 32344
Filed Feb. 6, 1989, Ser. No. 306,663
Term of patent 14 years
U.S. Cl. D21—136



318,699
TREADMILL
David L. Jacobson, 210 Redd Rd. #1010, El Paso, Tex. 79932, and William T. Dalebout, 1770 E. 1730 North, Logan, Utah 84321
Filed Feb. 1, 1989, Ser. No. 305,985
Term of patent 14 years
U.S. Cl. D21—192



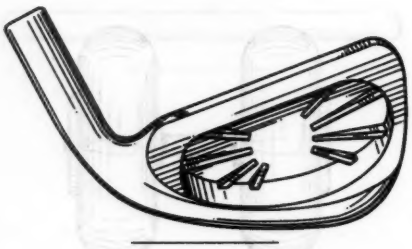
318,700
DUMBBELL
Raymond L. Davis, 13225 SW. Brittany Dr., Tigard, Oreg. 97223
Filed Oct. 31, 1988, Ser. No. 264,496
Term of patent 14 years
U.S. Cl. D21—197



318,701
WOOD TYPE GOLF CLUB HEAD
Anthony J. Antonious, 205 E. Joppa Rd., Towson, Md. 21204
Filed Oct. 22, 1986, Ser. No. 922,140
Term of patent 14 years
U.S. Cl. D21—214

318,702
GOLF PUTTER HEAD
Lawrence Y. Igarashi, 25532 Rapid Falls Rd., Laguna Hills, Calif. 92653
Filed Jan. 25, 1989, Ser. No. 301,741
Term of patent 14 years
U.S. Cl. D21—219

318,703
GOLF CLUB HEAD
William B. Shearer, 2905 W. Main St., Muncie, Ind. 47305
Filed Nov. 25, 1988, Ser. No. 275,546
Term of patent 14 years
U.S. Cl. D21—220

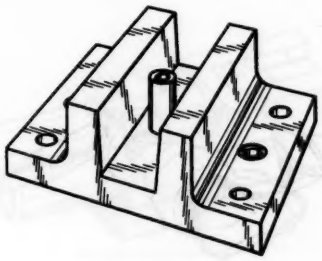


318,704
IDENTIFICATION MARKER TIP FOR SPORTS ARTICLES OR THE LIKE
Elie P. Cevert, 26, Boulevard d'Argenson, 92200 Neuilly-sur-Seine, France
Filed Sep. 21, 1987, Ser. No. 98,682
Claims priority, application France, Mar. 20, 1987, 871640
Term of patent 14 years
U.S. Cl. D21—221

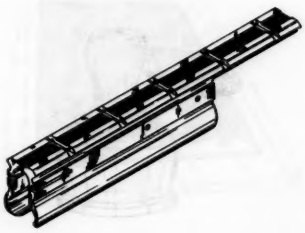
318,705
PROTECTIVE COVER FOR GOLF CLUBS
Anthony Arato, 319 Getz Ave., Staten Island, N.Y. 10312
Filed Dec. 12, 1988, Ser. No. 283,883
Term of patent 14 years
U.S. Cl. D21—221

318,706
PORTABLE STRUCTURE
Lowell R. Norman, Montrose, Calif., assignor to Pure Concepts, Inc., Pasadena, Calif.
Filed Feb. 29, 1988, Ser. No. 162,366
Term of patent 14 years
U.S. Cl. D21—253

318,707
BOW SIGHT LOCKING PAD
Theodore E. Barrow, 10129 Cavalier Ct., St. Louis, Mo. 63138
Filed Jul. 11, 1988, Ser. No. 217,605
Term of patent 14 years
U.S. Cl. D22—107

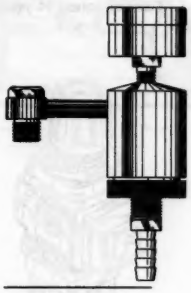


318,708
PISTOL SCOPE MOUNT
Daniel L. Bechtel, Inwood Rd., Forth Worth, Tex. 76109
Filed Oct. 11, 1988, Ser. No. 256,371
The portion of the term of this patent subsequent to Jul. 16, 2005, has been disclaimed.
Term of patent 14 years
U.S. Cl. D22—110

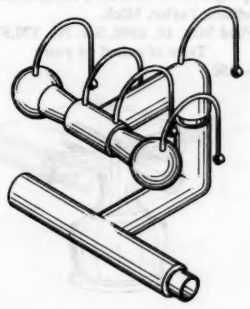


318,709
RETRACTABLE DECOY
Bob Osmon, and Joe Brooks, both of P.O. Box 120, Bald Knob, Ark. 72010
Filed Mar. 21, 1989, Ser. No. 326,254
Term of patent 14 years
U.S. Cl. D22—125

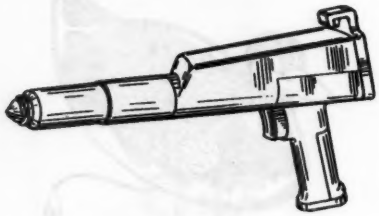
318,710
FUEL LINE FILTER
Paul D. Sergi, 2351 Ravenna Rd., Hudson, Ohio 44236
Filed Aug. 15, 1988, Ser. No. 232,654
Term of patent 14 years
U.S. Cl. D23—209



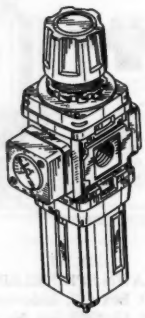
318,711
LAWN SPRINKLER
Carlos E. Dowell, P.O. Box 419, Anderson, Calif. 96002
Filed Apr. 17, 1989, Ser. No. 338,769
Term of patent 14 years
U.S. Cl. D23—214



318,712
SPRAY GUN FOR COATING ARTICLES
Karl Buschor, St. Gallen, Switzerland, assignor to Ransburg-Gema AG, St. Gallen, Switzerland
Filed Dec. 14, 1988, Ser. No. 284,465
Claims priority, application Int'l Pat. Institute, Jul. 4, 1988, DM/011281
Term of patent 14 years
U.S. Cl. D23—226

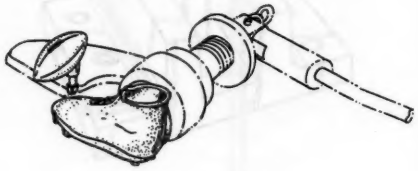


318,713
COMBINED PRESSURE REGULATOR AND FILTER
Kouichi Miyake, Kani; Kazuya Hosoda, Aichi, and Hisanobu Niwa, Komaki, all of Japan, assignors to CKD Kabushiki Kaisha, Komaki, Japan
Filed Mar. 30, 1989, Ser. No. 330,736
Claims priority, application Japan, Sep. 30, 1988, 63-38446
Term of patent 14 years
U.S. Cl. D23—235

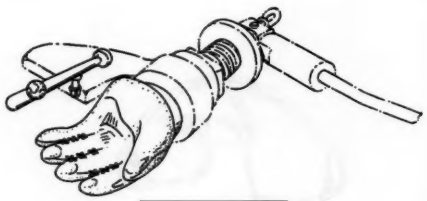


318,714
FAUCET HANDLE
Anthony G. Spangler, Sheridan, Ind., assignor to Masco Corporation of Indiana, Taylor, Mich.
Filed Mar. 18, 1988, Ser. No. 170,977
Term of patent 14 years
U.S. Cl. D23—250

318,715
ORNAMENTS FOR TOILET FLUSH HANDLES
Ronald P. Hardman, 1046 W. Tropicana Ct., Ontario, Canada 91762
Filed Sep. 23, 1987, Ser. No. 100,076
Term of patent 14 years
U.S. Cl. D23—251

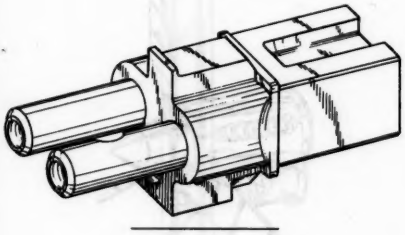


318,716
ORNAMENTS FOR TOILET FLUSH HANDLES
Ronald P. Hardman, 1046 W. Tropicana Ct., Ontairo, Calif. 91762
Filed Sep. 23, 1987, Ser. No. 100,077
Term of patent 14 years
U.S. Cl. D23—251

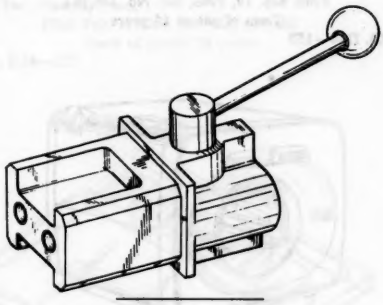


318,717
HANDLE FOR A FAUCET
Anthony G. Spangler, Sheridan, Tenn., assignor to Masco Corporation of Indiana, Taylor, Mich.
Filed Mar. 18, 1988, Ser. No. 170,975
Term of patent 14 years
U.S. Cl. D23—252

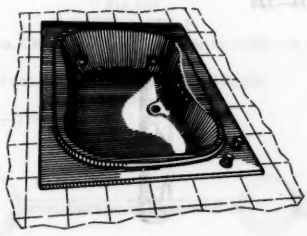
318,718
QUICK DISCONNECT COUPLING
John A. Blatt, 47 Willison, Grosse Pointe Shores, Mich. 48236
Filed Sep. 6, 1988, Ser. No. 240,574
Term of patent 14 years
U.S. Cl. D23—262



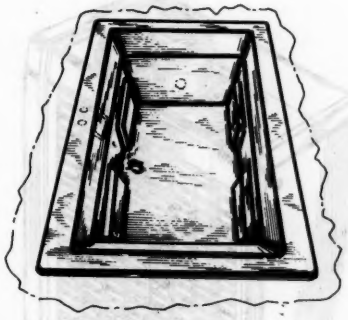
318,719
QUICK DISCONNECT COUPLING
John A. Blatt, 47 Willison, Grosse Pointe Shores, Mich. 48236
Filed Sep. 6, 1988, Ser. No. 240,575
Term of patent 14 years
U.S. Cl. D23—262

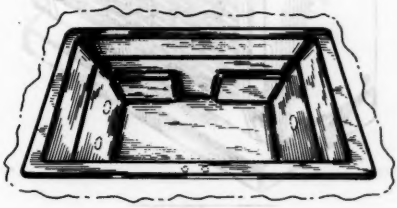


318,720
SUNKEN BATHTUB
Kent A. Dowse, 9941 NW. Palm St., Coon Rapids, Minn. 55433
Filed Nov. 7, 1988, Ser. No. 268,357
Term of patent 14 years
U.S. Cl. D23—277

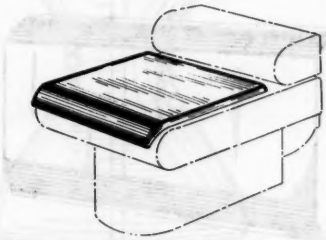


318,721
TUB OR THE LIKE
Mary J. Reid, Sheboygan, Wis., assignor to Kohler Co., Kohler, Wis.
Filed Jan. 11, 1988, Ser. No. 142,874
Term of patent 14 years
U.S. Cl. D23—280

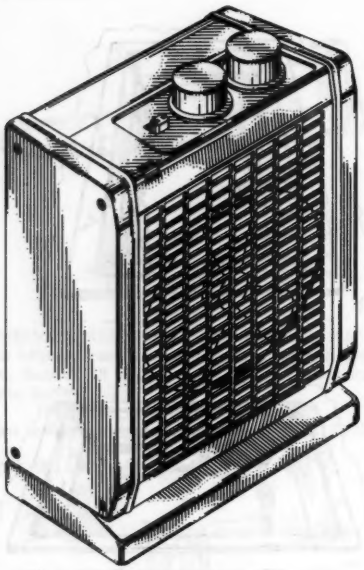




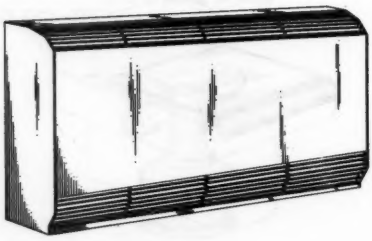
318,722
PLUMBING FIXTURE COVER
Herbert V. Kohler, Jr., Kohler, and Mary J. Reid, Sheboygan, both of Wis., assignors to Kohler Co., Kohler, Wis.
Filed Jan. 12, 1988, Ser. No. 144,437
Term of patent 14 years
U.S. Cl. D23—311



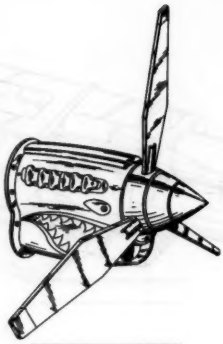
318,723
PORTABLE FAN HEATER
Bernard Chiu, Ashland, Mass., assignor to Duracraft Corporation, Sudbury, Mass.
Filed Apr. 17, 1990, Ser. No. 510,791
Term of patent 14 years
U.S. Cl. D23—337



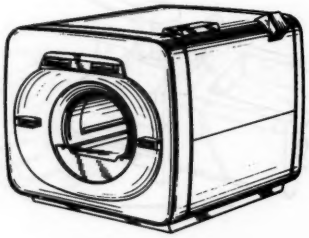
318,724
DESIGN FOR AN AIR DISTRIBUTION UNIT
S. Richard Avari, Garden City, N.Y., assignor to CTS Consolidated Technical Services, Inc., Garden City, N.Y.
Filed Jun. 21, 1990, Ser. No. 541,712
Term of patent 14 years
U.S. Cl. D23—370



318,725
CEILING MOUNTED FAN
Eduard A. Jaeger, 19000 Wyandotte St., Reseda, Calif. 91325
Filed May 22, 1989, Ser. No. 354,674
Term of patent 14 years
U.S. Cl. D23—377



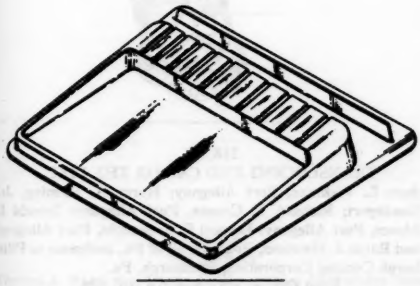
318,726
MAGNETIC RESONANCE IMAGING SCANNER
Isamu Takekoshi, Tokyo; Mikio Shimizu, Kodaira; Minoru Saito, Ibaragi, and Tuyoshi Shudo, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Sep. 19, 1988, Ser. No. 246,182
Term of patent 14 years
U.S. Cl. D24—159



318,727
VIAL
Frederick W. Spike, Wilmington, N.C., assignor to Sun Brokers, Inc., Wilmington, N.C.
Filed Nov. 4, 1988, Ser. No. 267,114
Term of patent 14 years
U.S. Cl. D24—224

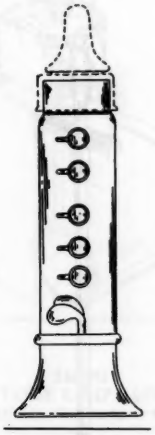
318,728
TEST TUBE
Sholom Braune, 17 Marguerite Ave., Leominster, Mass. 01453
Filed Apr. 25, 1988, Ser. No. 185,815
Term of patent 14 years
U.S. Cl. D24—224

318,729
MEDICAL SPONGE TRAY
Kathy W. Zachry, Kingston, Tenn., assignor to DeRoyal Industries, Inc., Powell, Tenn.
Filed Feb. 1, 1989, Ser. No. 305,485
Term of patent 14 years
U.S. Cl. D24—227

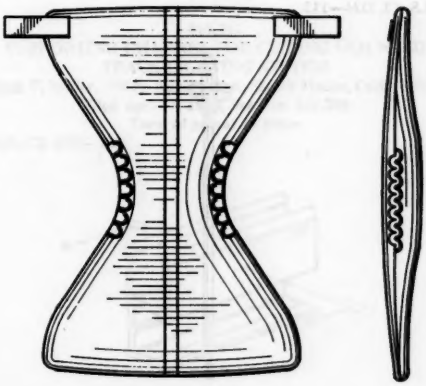


318,730
COTTON SWAB
Pietro Schiavo, Chiuppano, Italy, assignor to ivalda spa, Chiuppano, Italy
Filed Apr. 19, 1988, Ser. No. 183,666
Term of patent 14 years
U.S. Cl. D24—119

318,731
BABY BOTTLE
Paul L. Chapin, 1783 Haight St., San Francisco, Calif. 94117, assignor to Paul Leon Chapin, San Francisco, Calif.
Filed May 16, 1989, Ser. No. 352,811
Term of patent 14 years
U.S. Cl. D24—198



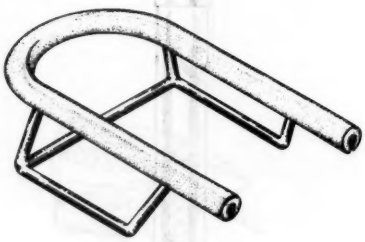
318,732
DIAPER
Paul F. Chautin, CBS Trailer Park, Opeloosas, La. 70570
Filed Sep. 2, 1988, Ser. No. 239,844
Term of patent 14 years
U.S. Cl. D24—126



318,733
PULL-APART SHEATH INTRODUCER FOR PERCUTANEOUS CATHETER INTRODUCTION
Mark H. Wyzgala, Bellevue, Wash., assignor to Quinton Instrument Company, Seattle, Wash.
Filed Mar. 24, 1988, Ser. No. 172,351
Term of patent 14 years
U.S. Cl. D24—112

318,734
PULL-APART SHEATH INTRODUCER FOR PERCUTANEOUS CATHETER INTRODUCTION
Mark H. Wyzgala, Bellevue, Wash., assignor to Quinton Instrument Company, Seattle, Wash.
Filed Mar. 24, 1988, Ser. No. 172,360
Term of patent 14 years
U.S. Cl. D24—112

318,735
HEAD REST
Donald J. Draxler, 6011 - #201 S.E. Martinique, Stuart, Fla. 34997
Filed Nov. 8, 1989, Ser. No. 433,719
Term of patent 14 years
U.S. Cl. D24—183

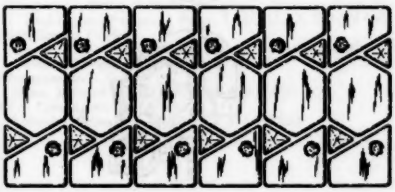


318,736
ATHLETIC KNEE BRACE
James D. Castillo, Laguna Hills, Calif., assignor to Innovation Sports, Inc., Irvine, Calif.
Filed Sep. 5, 1989, Ser. No. 403,711
Term of patent 14 years
U.S. Cl. D24—190

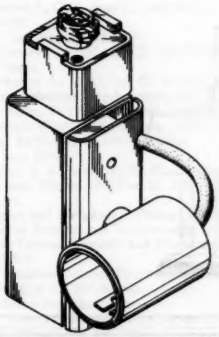
318,737
TRANSLUCENT END CAP OR THE LIKE
Robert L. Wehman, Port Allegany; Harry A. Fleming, Jr., Smethport; Richard Y. Greene, Port Allegany; Donald L. Moses, Port Allegany; Edward F. Fosnaught, Port Allegany, and Ralph J. Harrison, Roulette, all of Pa., assignors to Pittsburgh Corning Corporation, Pittsburgh, Pa.
Filed Oct. 9, 1987, Ser. No. 107,526
Term of patent 14 years
U.S. Cl. D25—103

318,738
BASEBOARD MOLDING SEGMENT HAVING A DUPLEX OUTLET
William W. Clodfelter, Sr., 225 Beresford Pl., Columbia, S.C. 29210
Filed Jul. 6, 1988, Ser. No. 215,929
Term of patent 14 years
U.S. Cl. D25—119

318,739
TILE UNIT
Thomas J. Ryan, San Diego, Calif., assignor to Watkins Manufacturing Corporation, Carlsbad, Calif.
Filed Jun. 14, 1988, Ser. No. 206,625
Term of patent 14 years
U.S. Cl. D25—138

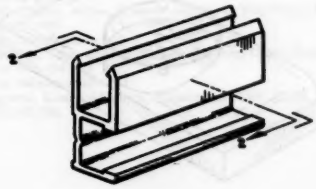


318,740
TRACK LIGHTING FIXTURE
Bruce N. Layne, Wheaton, Ill., assignor to Cooper Industries, Inc., Houston, Tex.
Filed Nov. 14, 1988, Ser. No. 271,196
Term of patent 14 years
U.S. Cl. D26—63

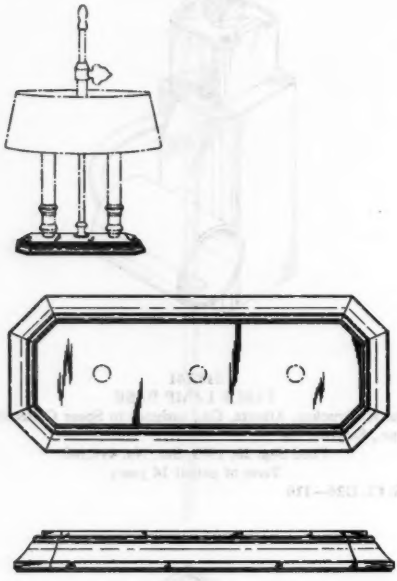


318,741
TABLE LAMP BASE
John R. Drucker, Atlanta, Ga., assignor to Speer Collectibles, Inc., Smyrna, Ga.
Filed Sep. 28, 1989, Ser. No. 414,140
Term of patent 14 years
U.S. Cl. D26—110

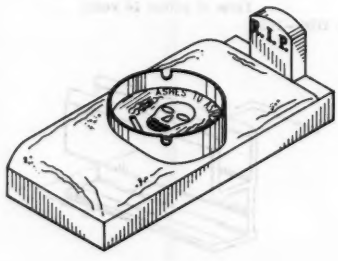
318,742
SUPPORTING CHANNEL FOR CEILING MOUNTED TRACK LIGHTING SYSTEM
Jack V. Miller, 700 N. Auburn Ave., Sierra Madre, Calif. 91024
Filed Apr. 17, 1989, Ser. No. 339,358
Term of patent 14 years
U.S. Cl. D26—140



318,743
LAMP BASE
Leslie A. Meck, Blandon, and Peter Pettersson, Bernville, both of Pa., assignors to Baldwin Hardware Corporation, Reading, Pa.
Filed Jul. 31, 1989, Ser. No. 387,312
Term of patent 14 years
U.S. Cl. D26—142



318,744
ASHTRAY
Jeffery M. Watras, 108 Pine St., Ludlow, Mass. 01056
Filed Oct. 25, 1988, Ser. No. 262,015
Term of patent 14 years
U.S. Cl. D27—106



318,745
EPILATOR
Marten F. Elkerbout, Drachten, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Oct. 31, 1989, Ser. No. 430,445
Claims priority, application Netherlands, May 16, 1989, DM/013576
Term of patent 14 years
U.S. Cl. D28—10

318,746
TOOTHPICK DISPENSER
Mary E. Austin, 1165 Wilberforce Clifton Rd., Wilberforce, Ohio 45384
Filed Feb. 17, 1989, Ser. No. 312,231
Term of patent 14 years
U.S. Cl. D28—64

318,747
INFLATABLE HELMET
Gina M. Barker, Little Bealings, United Kingdom, assignor to Unique Events Products Inc., San Diego, Calif.
Filed Apr. 6, 1990, Ser. No. 506,007
Claims priority, application United Kingdom, Feb. 8, 1990, 2004570
Term of patent 14 years
U.S. Cl. D29—15

# LIST OF PATENTEES

## TO WHOM

## PATENTS WERE ISSUED ON THE 30TH DAY OF JULY, 1991

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A.T.F. Consolidated, Inc.: *See—*
DiGiovanna, Leonard D.; and Panetta, Patrick F., 5,036,530, Cl. 378-208.000.

AB Volvo: *See—*
Arvidsson, Hans-Olof, 5,035,446, Cl. 280-775.000.
Dorsett, Michael W., 5,035,136, Cl. 72-450.000.
Sjostrand, Goran, 5,035,296, Cl. 180-297.000.

Abandaco, Inc.: *See—*
Blackburn, William A., 5,035,941, Cl. 428-286.000.

Abbatte, Gerard P.: *See—*
Breads, Peter R.; Abbatte, Gerard P.; and Warunek, Stephen P., 5,035,613, Cl. 433-6.000.

Abbott Laboratories: *See—*
Grandone, Cass J., 5,035,861, Cl. 422-64.000.
Stein, Herman H.; and Plattner, Jacob J., 5,036,051, Cl. 514-18.000.

Abdel-Rahman, Mahmoud F., to Hewlett-Packard Company. Mass flow sensor having wide dynamic range. 5,035,138, Cl. 73-204.150.

Abdo, Suheil F.: *See—*
West, Martin; and Abdo, Suheil F., 5,036,033, Cl. 502-64.000.

Abe, Masayoshi: *See—*
Suzuki, Kunio; Abe, Masayoshi; Kinka, Mikio; Arai, Yasuyuki; Satake, Akemi; Nishi, Kazuo; Kugawa, Shuichi; and Ishida, Noriya, 5,035,753, Cl. 136-249.000.

Abe, Mitsue: *See—*
Matsushima, Osamu; Maehashi, Yukio; Katori, Shigetatsu; Nomura, Masahiro; Shinohara, Hiroko; Kariya, Kohichi; and Abe, Mitsue, 5,036,458, Cl. 364-200.000.

Abe, Yoshio: *See—*
Yasumoto, Yoshio; Kageyama, Sadashi; Inoue, Syuji; Abe, Yoshio; and Uwabata, Hideyo, 5,036,386, Cl. 358-12.000.

Abe, Yuji: *See—*
Ohishi, Toshiyuki; Abe, Yuji; Sugimoto, Hiroshi; Ohisuka, Kenichi; and Matsui, Teruhito, 5,036,372, Cl. 357-16.000.

Abela, George S.; and Friedl, Stephan E., to University of Florida. Angioscopic system and method for dimensional measurement including measurement of the distance from angioscopic ends to designated planes. 5,036,463, Cl. 364-413.130.

Abodishish, Hani A. M., to Westinghouse Electric Corp. Retort assembly for kroll reductions. 5,035,404, Cl. 266-148.000.

Abou-Gharbia, Magid A., to American Home Products Corporation. Polycyclic phenalkyl amines as psychotropic agents. 5,036,070, Cl. 514-252.000.

Academy of Applied Science: *See—*
Greenblatt, Richard D., 5,036,513, Cl. 370-125.000.

Acco World Corporation: *See—*
Cooper, Edward W.; and Dewberry, Peter, 5,035,526, Cl. 402-75.000.

ACER Incorporated: *See—*
Tsao, Chyi, 5,036,186, Cl. 250-208.100.

Ackerman, David, to Bridport Aviation Products Limited. Safety arrangement for overhead luggage bins in aircraft passenger cabins. 5,035,471, Cl. 312-291.000.

Ackerman, William H., Jr.; and Sainola, John P., to Grumman Aerospace Corporation. Method of controlling and monitoring a store. 5,036,465, Cl. 364-423.000.

Ackerman, William H., Jr.: *See—*
Fitzgerald, Frank; and Ackerman, William H., Jr., 5,036,466, Cl. 364-423.000.

Ackermann, Peter: *See—*
Tobler, Hans; Ackermann, Peter; and Nyfeler, Robert, 5,036,084, Cl. 514-355.000.

Acme Resin Corporation: *See—*
Iyer, S. Raja; and Trikha, Sudhir K., 5,036,116, Cl. 523-145.000.

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Adachi, Ryoichi: *See—*
Shibata, Mitsuru; Hiramatsu, Yoshiyuki; Adachi, Ryoichi; and Mitsutake, Kenichiro, 5,035,739, Cl. 71-91.000.

Adair, Paul C.: *See—*
Gottschalk, Peter; Neckers, Douglas C.; Schuster, Gary B.; Adair, Paul C.; and Pappas, S. Peter, 5,035,621, Cl. 433-226.000.

Adams, Steven P.: *See—*
Olander, Jitka V.; Connolly, Daniel T.; Adams, Steven P.; and Feder, Joseph, 5,036,003, Cl. 435-70.100.

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Stone, Bernard D., 5,035,521, Cl. 400-17.000.

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Teisseire, Bernard, 5,036,076, Cl. 514-299.000.

Advanced Building Technologies, Inc.: *See—*
Newsom, Bob G., 5,035,098, Cl. 52-589.000.

Advanced Cardiovascular Systems, Inc.: *See—*
Kasprzyk, Daniel J.; Orth, Jean C.; and Gaiser, John W., 5,035,694, Cl. 606-27.000.

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Schmid, Lawrence A., 5,035,795, Cl. 210-197.000.

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Damongeot, Alain, 5,035,577, Cl. 416-223.00R.
Lamotte, Lionel; Mirey, Jean-Claude; Omiel, Jean; and Gaquere, Jean-Pierre, 5,035,556, Cl. 409-218.000.

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Lissaman, Peter B. S.; Morgan, W. R.; Cowley, Martyn B.; Sink, Charles J.; and Watson, William D., 5,035,382, Cl. 244-190.000.

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Lutze, Theodor; and Weisshaupt, Dieter, 5,035,232, Cl. 128-20.000.

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Suzuki, Teruo; Ogawa, Kenichi; and Murakami, Hiroshi, 5,035,780, Cl. 204-129.350.
Watanabe, Tadahiko; Doutsu, Tsuyoshi; Shobu, Kazuhisa; and Kai, Yukio, 5,036,028, Cl. 501-96.000.

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Odenwalder, Heinrich; Kruger, Thomas; and Schumann, Hans-Joachim, 5,035,987, Cl. 430-544.000.

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Kim, Eung S.; Kim, Byung J.; and Ahn, Seong J., 5,036,171, Cl. 219-10.55D.

Aignesberger, Alois; Weichmann, Josef; Plank, Johann; and Bichler, Manfred, to SKW Trostberg Aktiengesellschaft. Thermostable polymers. 5,035,812, Cl. 252-8.510.

Aihara, Etsuji: *See—*
Tanaka, Shoji; Yamauchi, Hisao; Yamada, Yukio; Ohnuki, Masayoshi; Morita, Etsuji; Toyoshima, Mitsunobu; Wada, Yasuo; Hinoshita, Hirotaka; Ikeda, Wataru; Aihara, Etsuji; Kobayashi, Tutomu; and Suguro, Kuniaki, 5,035,597, Cl. 425-135.000.

Aihara, Toshinori: *See—*
Akaike, Seiji; Aihara, Toshinori; and Sudo, Yukio, 5,035,584, Cl. 417-295.000.

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Chen, Michael S.; and Cook, Philip J., 5,035,726, Cl. 55-16.000.
Chen, Michael S., 5,035,727, Cl. 55-16.000.
Costello, Christine A.; and Dickenson, John B., 5,035,841, Cl. 260-404.500.

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Fukumoto, Ryoichi; and Hayakawa, Shigeru, 5,035,453, Cl. 292-336.300.
Fukumoto, Ryoichi; Hayakawa, Shigeru; Torii, Nozomu; and Okudaira, Souichiro, 5,035,454, Cl. 292-337.000.
Tateishi, Yosuke; Takano, Norihisa; and Hashimoto, Kenji, 5,035,512, Cl. 374-142.000.

Aizawa, Hitomi, to Seiko Epson Corporation. Magnetic encoder with high resolution of data signal recording at reduced recording pitch. 5,036,276, Cl. 324-207.210.

Aizawa, Kooji; Nii, Katsutoshi; Kawaike, Kazuhiko; Hasegawa, Kengo; Saruta, Akira; and Nakashima, Ryoichi, to Hitachi, Ltd. Submersible thrust bearing apparatus. 5,035,519, Cl. 384-121.000.

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Ajinomoto Co., Inc.: *See—*
Majima, Eiji; Takino, Hiroaki; Izawa, Kunisuke; Yokozeki, Kenzo; and Kubota, Koji, 5,036,004, Cl. 435-116.000.
Ozeki, Kohji; Tsukamoto, Yoshitsugu; Yaginuma, Hideya; and Sato, Makoto, 5,036,052, Cl. 514-19.000.

Akaike, Seiji; Aihara, Toshinori; and Sudo, Yukio, to Atsugi Motor Parts Co., Ltd. Variable-delivery vane-type rotary compressor. 5,035,584, Cl. 417-295.000.

Akao, Masaru: *See—*
Aoki, Hideki; Akao, Masaru; and Shin, Yoshiharu, 5,035,711, Cl. 623-11.000.

Akesaka, Toshio: *See—*
Kawafuji, Takayuki; Akesaka, Toshio; and Ooka, Sinkiti, 5,035,539, Cl. 405-154.000.

Akizawa, Mitsuru: *See—*
Noguchi, Kouki; Akizawa, Mitsuru; and Kato, Kanji, 5,036,486, Cl. 365-49.000.

Akkala, Walter I. Self sealing vacuum vent and dome process. 5,035,103, Cl. 53-434.000.

Akutsu, Yoshinori: *See—*
Uemura, Katsuoki; Ando, Masaru; Yamauchi, Jun-Ichi; and Akutsu, Yoshinori, 5,035,849, Cl. 264-255.000.

Akzo NV: *See—*
Schmer, Gottfried, 5,035,801, Cl. 210-490.000.

Alam, Abu S.; Sayeed, Fakrul A. A.; Koziol, Kenneth J.; and Kapoor, John N., to Fujisawa USA, Inc. Cyclophosphamide. 5,036,060, Cl. 514-110.000.

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Bartlett, Robert W.; Jorgensen, Paul J.; Allam, Ibrahim M.; and Rowcliffe, David J., 5,035,957, Cl. 428-552.000.

Allen, Douglas J. M.; and O'Neill, Brian T., to Pfizer Inc. Anhydrous, crystalline sodium salt of 5-chloro-3-(2-thenoyl)-2-oxindole-1-carboxamide. 5,036,099, Cl. 514-414.000.

Allen, Nelson K.: *See—*
Sanford, John C.; Wolf, Edward D.; and Allen, Nelson K., 5,036,006, Cl. 435-172.100.

Allen, William P.; and Miles, Peter, to Chubb Fire Limited. Fluid flow control valve. 5,035,259, Cl. 137-488.000.

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Langley, John; Symes, Kenneth C.; and Holm, Peter, 5,035,900, Cl. 424-484.000.

Allied-Signal Inc.: *See—*
Hazel, Barry D., 5,036,194, Cl. 250-227.210.
Magid, Hillel; Shankland, Ian R.; Wilson, David P.; Cook, Kane D.; and Lund, Earl A. E., 5,035,831, Cl. 252-171.000.
Nathasingh, Davidson M.; Martis, Ronald J. J.; and Datta, Amitava, 5,035,755, Cl. 148-304.000.
Wu, Chengjiu, 5,036,142, Cl. 525-348.000.

Allied Tube & Conduit Corporation: *See—*
Maitra, Kalyan K.; and Patel, Vijay B., 5,035,042, Cl. 29-527.400.

Allinder, Michael F. Multipurpose belt. 5,035,523, Cl. 401-6.000.

Alps Electric Co., Ltd.: *See—*
Kamigaki, Tomoo; Tokunaga, Ichiro; Yanagita, Satoshi; and Hayasaka, Koro, 5,035,960, Cl. 428-694.000.
Nagamori, Shuichi; and Yoshida, Toru, 5,036,415, Cl. 360-104.000.
Ohnishi, Kazumasa; Nakazawa, Toru; and Manabe, Yukimitsu, 5,036,245, Cl. 310-323.000.
Ouchi, Junichi; Nakase, Koji; and Sasaki, Hiroaki, 5,036,182, Cl. 235-462.000.
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Takii, Yasuo; and Fujino, Hitoshi, 5,036,440, Cl. 362-95.000.

Alsenz, Richard H. Apparatus for monitoring solenoid expansion valve flow rates. 5,035,119, Cl. 62-225.000.

Altenbach, Paul J., Jr. Staple removal tool. 5,035,400, Cl. 254-28.000.

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Kaufhold, Horst T.; and Altherr, Russell G., 5,035,338, Cl. 213-50.000.

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Lacourse, Norman L.; and Altieri, Paul A., 5,035,930, Cl. 428-35.600.

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Alumax Inc.: *See—*
Waggoner, Richard L., 5,035,172, Cl. 98-37.000.

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Ayer, Atul D.; Kuczynski, Anthony L.; and Wong, Patrick S., 5,035,897, Cl. 424-473.000.

Alznauer, Kurt, to Elpatronic AG. Method and apparatus for positioning a can body. 5,035,569, Cl. 414-757.000.

Amada Company, Limited: *See—*
Sartorio, Franco; and Vergano, Stefano, 5,035,566, Cl. 414-729.000.

American Home Products Corporation: *See—*
Abou-Gharbia, Magid A., 5,036,070, Cl. 514-252.000.

American Maize-Products Company: *See—*
Furcsik, Susan L.; and Mauro, David J., 5,035,912, Cl. 426-578.000.

American Standard Inc.: *See—*
Carroll, John B.; and Hatzikazakis, Michael V., 5,035,582, Cl. 417-44.000.

Amersham International plc: *See—*
Finlan, Martin F.; and Brady, Michael A. W., 5,035,863, Cl. 422-82.050.

Ames Rubber Corporation: *See—*
Del Rosario, Chris, 5,035,950, Cl. 428-421.000.

Amico, Russell P.; and Klier, George M., to HR Textron Inc. Adjustable stator retainer assembly. 5,035,264, Cl. 137-625.650.

Amoco Corporation: *See—*
Kawakami, James H.; Harris, James E.; Maresca, Louis M.; and Robeson, Lloyd M., 5,036,150, Cl. 528-173.000.
Shields, Roger G., 5,035,291, Cl. 175-5.000.

Amon, Albert; Boksanyi, Laszlo K.; and Degott, Pierre, to SICPA Holding SA. Desensitizing ink for the printing of self-copying sheets. 5,035,743, Cl. 106-21.000.

AMP Incorporated: *See—*
Bakermans, Johannes C. W., 5,035,163, Cl. 83-86.000.
Casciotti, Albert; Dery, Ronald A.; and Zimmerman, Richard H., 5,035,628, Cl. 439-66.000.
Defibaugh, George R.; and Mosser, Benjamin H., III, 5,035,650, Cl. 439-609.000.
Hass, Jurgen; and Woller, Josef, 5,035,657, Cl. 439-748.000.
Kilpatrick, Jerry B.; and Lincoln, Clifford F., 5,035,639, Cl. 439-290.000.
Kourimsky, Friedrich A. J., 5,035,638, Cl. 439-275.000.
Kuiper-Moore, David B., 5,035,648, Cl. 439-595.000.
ten Berge, Eduardus F. A.; and van Alst, Gerardus M., 5,035,482, Cl. 350-96.200.
Vyas, Navin N., 5,035,918, Cl. 427-53.100.
Werner, Walter M., 5,035,660, Cl. 439-796.000.

AMSTED Industries Incorporated: *See—*
Kaufhold, Horst T.; and Altherr, Russell G., 5,035,338, Cl. 213-50.000.

An, Moon Houy, to Duk Yu Industrial Co., Ltd. Outside back mirror device for use in an automobile. 5,035,496, Cl. 350-605.000.

Analog Devices, Inc.: *See—*
Barrow, Jeffrey; Pratt, William J.; and Tsuei, Henry T., 5,036,322, Cl. 341-144.000.
Bulzachelli, John, 5,036,298, Cl. 331-23.000.

Andermann, Guy. Therapeutic use of DMDM Hydantoin. 5,036,095, Cl. 514-389.000.

Anderson, H. Clarke; and Sugamoto, Kazuomi, to University of Kansas. Bone inducing agent from a human osteosarcoma cell line. 5,035,901, Cl. 424-573.000.

Anderson, James E.; Dennis, Wendell; and Powers, Richard, to Marlen Research Corporation. Dual piston portioner and casing device. 5,035,671, Cl. 452-37.000.

Anderson, Marc A.; Tunesi, Simonetta; and Xu, Qunyin, to Wisconsin Alumni Research Foundation. Degradation of organic chemicals with titanium ceramic membranes. 5,035,784, Cl. 204-158.140.

Anderson, Randall R.: *See—*
Dickinson, Ben W. O.; Anderson, Randall R.; Dickinson, Robert W.; Dickinson, Eric W.; and Dykstra, Herman, 5,035,285, Cl. 166-65.100.

Anderson, William J.; and Bielskus, Algirdas, to Nastec, Inc. Lubrication system for roller transmission. 5,035,153, Cl. 74-206.000.

Ando, Hideo, to Kabushiki Kaisha Toshiba. Optical apparatus for detecting a focusing state. 5,036,185, Cl. 250-201.500.

Ando, Hitoshi, to Pioneer Electronic Corporation. GPS satellite signal tracking method for GPS receivers. 5,036,329, Cl. 342-357.000.

Ando, Masaru: *See—*
Uemura, Katsuoki; Ando, Masaru; Yamauchi, Jun-Ichi; and Akutsu, Yoshinori, 5,035,849, Cl. 264-255.000.

Andoe, Graham C., to Andoe, Inc. Method of protecting hulls of marine vessels from fouling. 5,035,759, Cl. 156-64.000.

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Andoe, Graham C., 5,035,759, Cl. 156-64.000.

Andrews, Peter; Dorn, Hubert; and Voege, Herbert, to Bayer Aktiengesellschaft. Anthelmintic active compound combinations. 5,036,069, Cl. 514-249.000.

Andrieu, Jean-Pierre; Gault, Dominique; and Henri, Jean-Claude, to Thomson-CSF. Method and device for the display of several radar images in a single mosaic. 5,036,326, Cl. 342-176.000.

Angelo Cremona & Figlio S.p.A.: *See—*
Cremona, Lorenzo, 5,035,164, Cl. 83-80.000.

Antoniades, Harry N.; and Lynch, Samuel E., to Institute of Moelcular Biology, Inc.; and President and Fellows of Harvard College. Round healing composiiton of IL-1 and PDGF or IGF-1. 5,035,887, Cl. 424-85.200.

Antonov, Alexandr A.; Petrov, Vyacheslav V.; and Antonova, Olga I. Device for display of information with complete scanning beam arrest. 5,036,401, Cl. 358-242.000.

Antonova, Olga I.: *See—*
Antonov, Alexandr A.; Petrov, Vyacheslav V.; and Antonova, Olga I., 5,036,401, Cl. 358-242.000.

Antunez, Bruce A., to Coast Foundry & Manufacturing Co., Inc. Toilet tank valve. 5,035,257, Cl. 137-414.000.

Aoki, Hideki; Akao, Masaru; and Shin, Yoshiharu, to Kabushiki Kaisya Advance Kaihatsu Kenkyujo. Transcutaneously implantable element. 5,035,711, Cl. 623-11.000.

Aoki, Shigeru: *See—*
Saeki, Yasuharu; Koyama, Noritoshi; Watanabe, Sumio; and Aoki, Shigeru, 5,035,899, Cl. 424-480.000.

Aoki, Takashi; Terayama, Satoshi; and Miyake, Junichi, to Honda Giken Kogyo Kabushiki Kaisha. Method of shift control in an automatic transmission. 5,035,157, Cl. 74-866.000.

Aoyama, Yoshitaka. Method for feeding slender parts. 5,035,039, Cl. 29-445.000.

Apfel, Marilyn A.; Ghebre-Sellassie, Isaac; and Nesbitt, Russell U., to Warner-Lambert Company. Water insoluble drugs coated by coacervated fish gelatin. 5,035,896, Cl. 424-456.000.

APOC, Inc.: *See—*
Janko, Michael; Moran, Ray; and Carlson, Norman, 5,035,345, Cl. 222-5.000.

Applied Materials, Inc.: *See—*
Nagashima, Makoto; Kobayashi, Naoaki; and Wong, Jerry, 5,035,751, Cl. 134-22.100.

Aqualon Company: *See—*
Sau, Arjun C., 5,036,137, Cl. 525-61.000.

Arabei, Boris G.; Kostyrev, Sergei B.; Mints, Alexandr S.; Pronin, Lev A.; Ryzhonkov, Dmitry I.; Sopochkin, Sergei A.; Stepnov, Sergei A.; Esikman, Vladimir L.; Vasiliev, Andrei V.; and Kolgin, ALexandr P. Method for cleaning ferromagnetic chip from a lubricant-coolant and an apparatus for carrying out the method. 5,036,170, Cl. 219-10.410.

Arai, Takayuki; Goto, Takaharu; and Hamai, Kyugo, to Nissan Motor Co., Ltd. Piston assembly of internal combustion engine. 5,035,210, Cl. 123-193.00P.

Arai, Tatsuo: *See—*
Ikenaga, Kouichi; and Arai, Tatsuo, 5,035,544, Cl. 407-105.000.

Arai, Yasuyuki: *See—*
Suzuki, Kunio; Abe, Masayoshi; Kinka, Mikio; Arai, Yasuyuki; Satake, Akemi; Nishi, Kazuo; Kugawa, Shuichi; and Ishida, Noriya, 5,035,753, Cl. 136-249.000.

Arai, Youtaro: *See—*
Nishiyama, Koji; Yamazaki, Masayuki; Tsukuda, Takeshi; and Arai, Youtaro, 5,035,744, Cl. 106-1.230.

Arciniega, Richard J. Basketball training facility. 5,035,423, Cl. 273-150.00A.

Arco Chemical Technology, Inc.: *See—*
Yamaguchi, Takeshi, 5,035,275, Cl. 164-34.000.

Ardco, Inc.: *See—*
Mamelson, Richard; and Watson, Allen, 5,035,085, Cl. 49-504.000.

Arita, Satoshi: *See—*
Takeuchi, Kanji; Setaka, Yousuke; and Arita, Satoshi, 5,035,218, Cl. 123-361.000.

Armstrong World Industries, Inc.: *See—*
Echterling, Garry K.; and Herweh, John E., 5,036,145, Cl. 525-431.000.

Arndt, Thomas: *See—*
Wegner, Gerhard; Schouten, Arend J.; Duda, Gisela; and Arndt, Thomas, 5,035,762, Cl. 156-230.000.

Arneson, Don A.: *See—*
Pike-Biegunski, Maciej J.; Krebaum, Paul; and Arneson, Don A., 5,036,249, Cl. 313-509.000.

Arnsteiner, Anton, to Blizzard Ges. m.b.H. Ski with a damping element. 5,035,442, Cl. 280-602.000.

Arora, Vijay K.; Jones, Gary V.; Kovtun, John M.; and Gabbard, Ronald G., to Kraft General Foods, Inc. Evaporative process for producing coffee glass. 5,035,908, Cl. 426-388.000.

Arraudeau, Jean-Pierre; and Boelle, Anne, to L'Oreal. Noncompacted make-up powder or powder for the care of the body and face containing synthetic thermoplastic material in the form of hollow microspheres. 5,035,885, Cl. 424-78.000.

Arthur D. Little, Inc.: *See—*
Spencer, Richard H.; Shanley, Edward S.; and Massucco, Arthur A., 5,035,145, Cl. 73-744.000.

Artime S.p.A.: *See—*
Alberti, Damiano, 5,036,499, Cl. 368-10.000.

Aruga, Tomoe; and Yokouchi, Hideya, to Seiko Epson Corporation. Magnetic head feeding device with a rack and pinion. 5,036,417, Cl. 360-106.000.

Arvidsson, Hans-Olof, to AB Volvo. Adjustable steering wheel. 5,035,446, Cl. 280-775.000.

Asahi Diamond Industrial Co. Ltd.: *See—*
Nishiguchi, Masanori; Sekiguchi, Takeshi; Miyoshi, Ikkei; and Nishio, Kiyoshi, 5,035,087, Cl. 51-131.100.

Asahi Glass Co., Ltd.: *See—*
Morimoto, Takeshi; and Yoshida, Naoki, 5,035,790, Cl. 204-290.00R.

Asahi Kogaku Kogyo K.K.: *See—*
Nagabusa, Yoshihuki, 5,036,397, Cl. 358-213.260.
Yamanaka, Toshimasa, 5,036,343, Cl. 354-82.000.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
Ito, Takayuki, 5,035,492, Cl. 350-423.000.
Kawano, Kiyoshi, 5,036,345, Cl. 354-126.000.
Suzuki, Noboru; Toji, Shigeo; and Kawasaki, Masahiro, 5,036,349, Cl. 354-402.000.

Asahi, Masahiko; Shirakawa, Noriko; and Kikuta, Yuko, to Kao Corporation. Water-in-oil emulsion cosmetic. 5,036,108, Cl. 514-937.000.

Asahi, Naotatsu: *See—*
Kanamaru, Hisanobu; and Asahi, Naotatsu, 5,035,677, Cl. 464-138.000.

Asai, Masamichi: *See—*
Sugino, Takao; Kawamura, Toshio; Asai, Masamichi; Yamada, Hiroshi; Mukoyama, Kenichi; Takahashi, Akira; and Hikima, Hiroshi, 5,035,919, Cl. 427-140.000.

Asai, Nobuko: *See—*
Kitaura, Yoshihiko; Ito, Fumitaka; Stevens, Rodney W.; and Asai, Nobuko, 5,036,088, Cl. 514-375.000.

Asakawa, Shiro; Machida, Yasuhiko; Taomoto, Akira; and Nichogi, Katsuhiro, to Matsushita Electric Industrial Co., Ltd. Modulatory molecular element. 5,035,835, Cl. 252-500.000.

Asakura, Tsutou: *See—*
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, 5,036,270, Cl. 324-96.000.

Asano, Hiroshi: *See—*
Yoshikawa, Nobuyoshi; and Asano, Hiroshi, 5,035,850, Cl. 264-256.000.

Asano, Osamu; Shoji, Michihiro; and Kowada, Masunari, to Nitto Kohki Co., Ltd. Boring apparatus. 5,035,549, Cl. 408-132.000.

Asayama, Yoshio; Tsubota, Makio; Okura, Yasunori; and Sato, Takayuki, to Kabushiki Kaisha Komatsu Seisakusho. Apparatus for controlling hydraulic pressure for clutch. 5,035,312, Cl. 192-85.00R.

Aschwanden, Felix, to RCA Licensing Corporation. Oscillator for use with video signal time scaling apparatus. 5,036,293, Cl. 331-1.000.

Ashiba, Masahiro, to Tokico Ltd. Adjustable damping force hydraulic shock absorber. 5,035,306, Cl. 188-299.000.

AT&T Bell Laboratories: *See—*
Chapin, John T.; Jackson, Charles W.; Mensah, Thomas O.; and Reynolds, Mickey R., 5,035,169, Cl. 89-1.340.
Cloonan, Thomas J.; Jewell, Jack L.; McCormick, Frederick B., Jr.; Miller, David A. B.; and Prise, Michael E., 5,036,512, Cl. 370-2.000.
Dautremont-Smith, William C.; Katz, Avishay; Koszi, Louis A.; Segner, Bryan P.; and Thomas, Peter M., 5,036,023, Cl. 437-184.000.
Loftus, Thomas P., 5,036,452, Cl. 363-71.000.
Lu, Chih-Yuan; and Ting, Tah-Kang J., 5,036,378, Cl. 357-23.500.
Mollenauer, Linn F., 5,035,481, Cl. 350-96.160.

Atherton, Linda, to Electric Power Research Institute, Inc. Method for beneficiation of low-rank coal. 5,035,721, Cl. 44-594.000.

Atlas Electric Devices Company: *See—*
Huber, James V.; Patel, Bhakti S.; and Tikhtman, Jacob, 5,036,242, Cl. 313-35.000.

Atochem: *See—*
Granger, Claude; and Troadec, Bernard, 5,035,685, Cl. 493-416.000.

Atochem North America, Inc.: *See—*
Gardner, David M.; and Wheaton, Gregory A., 5,035,777, Cl. 204-79.000.

Atsugi Motor Parts Co., Ltd.: *See—*
Akaike, Seiji; Aihara, Toshinori; and Sudo, Yukio, 5,035,584, Cl. 417-295.000.

Atwell, Ray W.; Favstritsky, Nicolai A.; Stallings, John P.; and Termine, Enrico J., to Great Lakes Chemical Corporation. Flame retardant hot melt adhesive compositions. 5,036,129, Cl. 524-278.000.

Atwood, Harvey E., to Exxon Chemical Patents Inc. Isoprene recovery in the butyl rubber process. 5,035,794, Cl. 208-262.100.

Atwood, John G., to Tandem Computers Incorporated. Multiple power supply sensor for protecting shared processor buses. 5,036,455, Cl. 364-200.000.

Au, Andrew T., to Dow Chemical Company, The. Preparation of glycidyl esters. 5,036,154, Cl. 549-531.000.

Audhya, Tapan; and Goldstein, Gideon, to Immunobiology Research Institute, Inc. Lyophilized peptide formulations. 5,036,049, Cl. 514-17.000.

Audhya, Tapan; Venkatasubramanian, Krishnamurthy; and Goldstein, Gideon, to Immunobiology Research Institute, Inc. Compositions containing thymopentin for topical treatment of skin disorders. 5,036,050, Cl. 514-17.000.

Audio Research Corporation: *See—*
Hjelm, John R.; and Larson, Richard D., 5,036,292, Cl. 330-202.000.

Auerbach, Robert A.; and Berry, Doris, to Lord Corporation. Adhesive composition. 5,036,122, Cl. 524-259.000.

Aufdembrink, Brent A.; Chester, Arthur W.; and Chu, Pochen, to Mobil Oil Corporation. Crystalline oxides as catalysts. 5,036,159, Cl. 585-275.000.

Auffranc, Michel: *See—*
Coudurier, Pierre; Boutte, Pierre; Romeuf, Patrick; Tronchon, Paul; and Auffranc, Michel, 5,035,623, Cl. 434-286.000.

Augello, Frank A.: *See—*
Alchas, Paul G.; Augello, Frank A.; Brooks, Christopher J.; Cutshall, Tony A.; DiPisa, Joseph A., Jr.; Williams, Stuart K.; Gabel, Jonathan B.; Mulhauser, Paul J.; Prais, Wes; Jarrell, Bruce E.; and Rose, Deborah G., 5,035,708, Cl. 623-1.000.

Aura Systems, Inc.: *See—*
Lee, Yeon H.; and Um, Gregory, 5,035,475, Cl. 350-6.500.

Aussel, Jean-Daniel, to National Research Council of Canada. Frequency broadband measurement of the characteristics of acoustic waves. 5,035,144, Cl. 73-602.000.

Automobiles Citroen: *See—*
Moureaux, Philippe, 5,036,110, Cl. 121-137.000.

Automobiles Peugeot: *See—*
Moureaux, Philippe, 5,036,110, Cl. 121-137.000.

Automotive Products (USA) Inc.: *See—*
Leigh-Monstevens, Keith V., 5,035,158, Cl. 74-866.000.

Automotive Systems Laboratory, Inc.: *See—*
Poole, Donald R., 5,035,757, Cl. 149-46.000.

Auvray, Eric; and Perron, Claude, to Thomson Consumer Electronics. Synchronization method for the transmission, of an asynchronous channel, or a series of pictures encoded by means of a variable length code, and device for the implementation of this method. 5,036,391, Cl. 358-133.000.

Avdel Systems Limited: *See—*
Denham, Keith; and Dear, Aiden R., 5,035,129, Cl. 72-30.000.

Axelson, Peter; Heinrich, Michael; Lasko-Harvill, Ann; and Silverman, Michael W., to Pin Dot Products. Seating system. 5,035,467, Cl. 297-440.000.

Ayer, Atul D.; Kuczynski, Anthony L.; and Wong, Patrick S., to Alza Corporation. Dosage form for delivering soluble or insoluble drugs. 5,035,897, Cl. 424-473.000.

B. F. Goodrich Company, The: *See—*
Coaker, A. William M.; and Vyvoda, Josef C., 5,036,121, Cl. 524-100.000.
Weisend, Norbert A., Jr.; and Tritt, Paul G., 5,035,380, Cl. 244-134.00A.

B & G Consultants, Inc.: *See—*
Groves, George D., 5,035,079, Cl. 47-33.000.

Baba, Fumiaki; Izumi, Masanori; Sawa, Kenji; and Kurumida, Susumu, to Mazda Motor Corporation. Lock-up control system for automatic transmission. 5,035,308, Cl. 192-0.052.

Baba, Shigeo; Shibata, Yukio; Kawamura, Takahiro; Takaoka, Hideo; Kimura, Tsuguo; Kousaka, Kazuo; Minato, Yoshihiro; Yokoyama, Naruo; Iida, Kozo; and Imai, Tetsuya, to Research Association for Utilization of Light Oil. Solid strong acid catalyst process for the production of the same and use thereof. 5,036,035, Cl. 502-221.000.

Babcock & Wilcox Company, The: *See*—
Berneburg, Philip L.; and Krukonis, Val J., 5,035,921, Cl. 427-226.000.
Berthold, John W., 5,035,511, Cl. 374-124.000.
Latimer, Paul J.; and Whaley, Hubert L., 5,035,143, Cl. 73-598.000.

Bacaner, Marvin B. Methods for the treatment of disorders of the cardiac vascular system. 5,036,106, Cl. 514-643.000.

Bach, Helmut: *See*—
Kurtz, Karl-Rudolf; Koch, Horst; Telser, Thomas; and Bach, Helmut, 5,035,981, Cl. 430-327.000.

Bachhuber, Gerhard; and Buhse, Detlef, to Siemens Aktiengesellschaft. Modular ISDN communication system with formation and display of error texts. 5,036,318, Cl. 340-825.160.

Bachynsky, Maria O.; Infeld, Martin H.; Margolis, Richard J.; and Perla, Dennis A., to Hoffmann-La Roche Inc. Method of treating autoimmune diseases comprising administration of psoralen dosage forms. 5,036,102, Cl. 514-455.000.

Badesha, Santokh S.: *See*—
Kowalczyk, Lawrence E.; Badesha, Santokh S.; Zukoski, Paul F.; Hordon, Monroe J.; Sterling, Steven M.; Lees, Barry A.; Elder, Frederick A.; and LaForce, Roger W., 5,035,857, Cl. 420-579.000.

Bailey, Thomas F.; Campbell, John E.; and Kagler, Edmond, Jr., to MASX Energy Service Group, Inc. Whipstock starter mill with pressure drop tattletale. 5,035,292, Cl. 175-45.000.

Baird, William E.; and Tolan, Peter J. Apparatus for measuring small changes in liquid level in a container. 5,035,141, Cl. 73-296.000.

Baker, Julie: *See*—
Barnett, Anthony M.; Gray, Colin J.; and Baker, Julie, 5,035,978, Cl. 430-233.000.

Baker, Timothy J.; and Woods, John H. Overprint aqueous varnish. 5,035,946, Cl. 428-327.000.

Bakermans, Johannes C. W., to AMP Incorporated. Punches and dies for trimming the edges of strip material. 5,035,163, Cl. 83-86.000.

Baldwin, Alfred F.: *See*—
Kinlaw, William S.; and Baldwin, Alfred F., 5,035,943, Cl. 428-290.000.

Ban, Masakazu: *See*—
Taguchi, Hiroaki; Katsushima, Takeo; Ban, Masakazu; Takahashi, Mitsuru; Shinoda, Kiyotaka; and Watanabe, Akihiko, 5,036,086, Cl. 514-367.000.

Banyasz, Joseph L.: *See*—
Spruill, David B.; Banyasz, Joseph L.; and Van Auken, Thomas V., 5,035,731, Cl. 55-387.000.

Barber-Greene Company: *See*—
Brock, James D.; and Smith, Donald W., 5,035,534, Cl. 404-81.000.

Barcelon, Shirley A.: *See*—
Hussein, Mamoun M.; Barcelon, Shirley A.; and Lynch, Donald M., 5,035,882, Cl. 424-58.000.

Barillari, Piero; DeSanti, Pierluigi; Galderesi, Mario; Marchi, Carlo A.; Natili, Franco; Rossiello, Vincenzo; Settembre, Donato; and Urbinati, Francesco, to Sarin S.S. Ausiliari e Ricerca Informatica. Method and system for the integrated supply of telematic services and graphic information to user terminals, particularly for advertising purposes. 5,036,314, Cl. 340-717.000.

Barksdale, Gordon: *See*—
Hill, Robert M.; and Barksdale, Gordon, 5,035,540, Cl. 405-157.000.

Barnett, Anthony M.; Gray, Colin J.; and Baker, Julie, to Eastman Kodak Company. Image receiving element for use in a silver complex diffusion transfer process. 5,035,978, Cl. 430-233.000.

Barrios, J. Rene: *See*—
Zweifel, Terry L.; and Barrios, J. Rene, 5,036,480, Cl. 364-578.000.

Barrow, Jeffrey; Pratt, William J.; and Tsuei, Henry T., to Analog Devices, Inc. Digital-to-analog converters with improved linearity. 5,036,322, Cl. 341-144.000.

Bartkowicz, Robert J. Rotating grip for a baseball bat. 5,035,428, Cl. 273-72.00R.

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Steinhardt, Helmut; and Bieringer, Anton, 5,035,661, Cl. 439-839.000.

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Bosch, Karl, 5,035,304, Cl. 188-71.100.
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Birmingham, Scott D., 5,035,365, Cl. 241-14.000.
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Delalande, Francois; and Boulloy, Georges, 5,036,433, Cl. 361-529.000.
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Rorabaugh, Dale A.; Davis, Neil; Mansfield, George A., Jr.; and Brancaccio, Vince, 5,035,500, Cl. 351-226.000.
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Elbe, Hans-Ludwig; Brandes, Wilhelm; Dutzmann, Stefan; and Hanssler, Gerd, 5,036,073, Cl. 514-277.000.
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Fallows, John H.; and Breeding, Kenny D., 5,035,510, Cl. 366-126.000.
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Takeguchi, Hajime; Tabata, Toshiyuki; and Ishiyama, Tatsuro, 5,035,407, Cl. 267-140.100.
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Ackerman, David, 5,035,471, Cl. 312-291.000.
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Matthews, Nicholas, 5,035,381, Cl. 244-164.000.
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Brothers, Bruce J.: *See*—
Hetz, Mary N.; and Brothers, Bruce J., 5,035,006, Cl. 2-209.100.
Broughton, George L.: *See*—
Mate, David W.; Rogers, Duane E.; Billingsley, Henry C.; Broughton, George L.; and Belec, Glenn R., 5,035,211, Cl. 123-198.00E.
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Levinson, Lionel M.; Brown, Dale M.; and Thornton, Roy F., 5,035,964, Cl. 429-120.000.
Brown, Howard R., to D. S. Brown Company, Inc. Highway expansion joint strip seal. 5,035,533, Cl. 404-64.000.
Brown, James; and Kaufman, Jack W. Surgical scrub brush. 5,035,468, Cl. 300-21.000.
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Morich, Michael A.; Martens, Michael A.; and Brown, Robert W., 5,036,282, Cl. 324-318.000.
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Broze, Guy J.: *See*—
Durbut, Patrick J.; Mondin, Myriam M.; and Broze, Guy J., 5,035,826, Cl. 252-121.000.
Brucculeri, Louis S.; and Giddings, James N., to Texas Instruments Incorporated. Circuit for eliminating metastable events associated with a data signal asynchronous to a clock signal. 5,036,221, Cl. 307-443.000.
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Bruneau, Pierre A. R., to ICI Pharma; and Imperial Chemical Industries PLC. Heterocyclic agents. 5,036,083, Cl. 514-338.000.
Brunker, David L.: *See*—
Dixon, Daniel A.; Lee, Hsin; Zielke, Henry; Mysiak, Eugene J.; and Brunker, David L., 5,035,651, Cl. 439-609.000.

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Corbett, William D.; and Sheaffer, Benjamin L., 5,035,276, Cl. 164-34.000.

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Reimers, Ulrich, 5,036,395, Cl. 358-185.000.
Willmann, Hartmut; Dittmann, Ludwig; Heinz, Richard; and Lutzeler, Jorn, 5,036,418, Cl. 360-108.000.

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Wegner, Gerhard; Duda, Gisela; Bubeck, Christoph; and Schouten, Arend J., 5,035,763, Cl. 156-230.000.

Buchelt, Benno E., to Technolizenz Establishment. Free standing or aircraft lift generator. 5,035,377, Cl. 244-12.100.

Bucher, Robert, to Sulzer Brothers Limited. Picking belt for a gripper weaving machine. 5,035,268, Cl. 139-449.000.

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Buckley, Stephen P.; Robinson, Richard A.; Hurlburt, John H.; Pfahl, Kurt A.; and Doerflinger, Arthur E., to Hallmark Cards, Inc. Computer controlled machine for vending personalized products or the like. 5,036,472, Cl. 364-479.000.

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Krum, Richard G.; and Bucknam, Neil E., 5,035,396, Cl. 248-635.000.

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Persson, Tyko; Duc, Heribert; and Buhler, Marcel, 5,035,906, Cl. 426-285.000.

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Bachhuber, Gerhard; and Buhse, Detlef, 5,036,318, Cl. 340-825.160.

Bulzachelli, John, to Analog Devices, Inc. Clock recovery circuit without jitter peaking. 5,036,298, Cl. 331-23.000.

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Carter, Timothy J. N.; and Bunce, Roger A., 5,035,508, Cl. 356-416.000.

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Leiber, Heinz; Schneider, Werner; Waxenberger, Erich; Klarer, Martin; Zimmer, Richard; and Burckhardt, Manfred, 5,035,295, Cl. 180-140.000.

Burger, Wilhelm: *See*—
Bhanu, Bir; and Burger, Wilhelm, 5,036,474, Cl. 364-516.000.

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Burgeson, John R.; and Burgeson, John C., 5,035,435, Cl. 273-418.000.

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Willert, Hans-Georg; Koch, Rudolf; and Burgi, Maxa, 5,035,714, Cl. 623-16.000.

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Burke, Edward F., to Tektronix, Inc. Mass velocity controller. 5,036,266, Cl. 318-646.000.

Burley, John S., to Burley's Rink Supply. Sliding ice rink door. 5,035,416, Cl. 272-3.000.

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Piorunneck, Heinz; Noschese, Rocco J.; and Ramirez, Fernando J., 5,035,631, Cl. 439-108.000.
Schrader, Gary E.; and Nelson, H. Thomas, 5,036,164, Cl. 174-94.00R.

Burnett, Carl M.; and Wester, Karl H., to Storage Technology Corporation. Electronics interconnection mechanism. 5,035,627, Cl. 439-64.000.

Burns, Johnny L.; and Wilson, Richard, to Sandoz Ltd. Aminopropylmorpholine salts, compositions and uses thereof. 5,035,738, Cl. 71-88.000.

Burns, Matthew M., to SciMed Life Systems, Inc. Method of purging a balloon catheter. 5,035,705, Cl. 606-194.000.

Burow, Wilfried; Kischkewitz, Jurgen; and Schlak, Ottfried, to Bayer Aktiengesellschaft. Storage-stable inorganic pigments containing specific polyorganosiloxanes with long chain aryl and/or alkyl groups. 5,035,748, Cl. 106-499.000.

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Kneen, Geoffrey; Jackson, William P.; Islip, Peter J.; and Wates, Peter J., 5,036,157, Cl. 562-623.000.

Busch, Robert E.; Hovis, William P.; Redman, Theodore M.; Thoma, Endre P.; and Yankosky, James A., to International Business Machines Corp. Multiple mode-set for IC chip. 5,036,495, Cl. 365-233.000.

Buschbom, Floyd E., to Van Dale, Inc. Impeller assembly with adjustable impeller. 5,035,317, Cl. 198-642.000.

Bush, Stephen F., to Prosyma Research Limited. Filament separation in liquids. 5,035,848, Cl. 264-174.000.

Butler, Colin, to Embassy Gates Associates, L.P. Gate support and operating mechanism. 5,035,082, Cl. 49-334.000.

Butts, Michael R.; and Batcheller, Jon A., to Mentor Graphics Corporation. Method of using electronically reconfigurable logic circuits. 5,036,473, Cl. 364-489.000.

Buzak, Thomas S., to Tektronix, Inc. Flat panel apparatus for addressing optical data storage locations. 5,036,317, Cl. 340-783.000.

Byer, Robert L.; Fejer, Martin M.; and Lim, Eric J., to Leland Stanford Junior University. Nonlinear optical radiation generator and method of controlling regions of ferroelectric polarization domains in solid state bodies. 5,036,220, Cl. 307-427.000.

Byrd, Carl E.: *See*—
Beaver, Richard N.; Byrd, Carl E.; and Kelly, Stephen L., 5,035,789, Cl. 204-290.00R.

Byrnes, Francis E.; and Schmaling, David N., to United Technologies Corporation. Propeller blade pin attachment. 5,035,576, Cl. 416-134.00R.

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Crittenden, James F.; and Purtell, George J., 5,035,686, Cl. 604-96.000.
Rantanen-Lee, Ann M., 5,035,399, Cl. 251-10.000.

Cain, R. Neal; and Corda, Albert J., to United States of America, Navy. Active radar stealth device. 5,036,323, Cl. 342-6.000.

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Glaser, Edward L.; DesJardins, Paul R.; Caldwell, Douglas W.; and Glaser, Eliot D., 5,036,457, Cl. 364-200.000.

Calgon Corporation: *See*—
Hassick, Denis E.; and Miknevich, Joseph P., 5,035,808, Cl. 210-728.000.

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Dick, G. John; and Saunders, Jonathan E., 5,036,299, Cl. 331-25.000.

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Taguchi, Fumiaki; Mitsui, Isamu; Hara, Kinichi; Hayashi, Masaro; Ezawa, Kunio; Fukunaga, Kenichi; and Kuranari, Jun, 5,035,995, Cl. 435-4.000.

Camaggi, Giovanni: *See*—
Colle, Roberto; Camaggi, Giovanni; Gozzo, Franco; Ratti, Giuseppina; Mirenna, Luigi; and Garavaglia, Carlo, 5,036,094, Cl. 514-383.000.

Campbell, John E.: *See*—
Bailey, Thomas F.; Campbell, John E.; and Kagler, Edmond, Jr., 5,035,292, Cl. 175-45.000.

Canada, Her Majesty the Queen in right of, as represented by the Minister of Agriculture: *See*—
Jones, John D.; and McGinnis, Douglas S., 5,035,910, Cl. 426-478.000.

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Hiroi, Masakazu; Naito, Masataka; Hayakawa, Kimiaki; Kobayashi, Kenji; and Mukasa, Mitsuhiro, 5,035,412, Cl. 270-053.000.
Ishizuka, Koh; Nishimura, Tetsuharu; and Kasahara, Osamu, 5,036,192, Cl. 250-231.160.
Kawagishi, Hideyuki; Iwamoto, Hirofumi; Tsuboyama, Akira; and Mihara, Tadashi, 5,035,491, Cl. 350-350.00S.
Kojima, Toshihiro, 5,036,405, Cl. 358-448.000.
Kuwayama, Tetsuro; Taniguchi, Naosato; Yoshinaga, Yoko; and Kushibiki, Nobuo, 5,035,473, Cl. 350-3.700.
Mabuchi, Toshiaki, 5,036,399, Cl. 358-225.000.
Masunaga, Makoto, 5,036,390, Cl. 358-85.000.
Murasawa, Yoshihiro, 5,036,364, Cl. 355-251.000.
Okauchi, Shigeki; and Maeda, Masaya, 5,036,419, Cl. 360-109.000.
Tsunekawa, Tokuichi; Nagano, Akihiko; and Konishi, Kazuki, 5,036,347, Cl. 354-400.000.

Cardenas, David, to Cardenas, David. Pet automobile safety harness. 5,035,203, Cl. 119-96.000.

Care, Ronald J. Linear measuring devices. 5,035,064, Cl. 33-760.000.

Care Wise Medical Products Corporation: *See*—
Carroll, Robert G.; and Wise, Robin A., Jr., 5,036,201, Cl. 250-363.100.

Carley, Peter M.: *See*—
Finley, David A. J.; Carley, Peter M.; Stokes, James R.; and Napier, Robert C., 5,035,368, Cl. 241-212.000.

Carlo, Gatti; and Daniele, Zetti, to T.G.N. S.p.A. Hinge for pieces of furniture. 5,035,026, Cl. 16-288.000.

Carlson, John G.; and McCumber, Larry L., to L. J. Manufacturing, Inc. First fully adjustable sawmill with precise rapid cut band saw. 5,035,166, Cl. 83-801.000.

Carlson, Norman: *See*—
Janko, Michael; Moran, Ray; and Carlson, Norman, 5,035,345, Cl. 222-5.000.

Carmack, Paul D.; and Grantham, Rodger P., to Catlow, Inc. Vapor recovery fuel dispensing nozzle. 5,035,271, Cl. 141-206.000.

Carney, John M.: *See*—
Floyd, Robert A.; and Carney, John M., 5,036,097, Cl. 514-400.000.

Carotti, Luciano, to Pirelli SAPSA S.p.A. System and process for continuous manufacture of cellular products such as latex foam mattresses, cushions or the like. 5,035,846, Cl. 264-48.000.

Carr, Don F.: *See*—
Parazader, Stephen; and Carr, Don F., 5,035,093, Cl. 52-64.000.

Carrier Corporation: *See*—
Fraser, Howard H., Jr.; Boonzha, William J.; and Etemad, Shahrokh, 5,035,589, Cl. 418-1.000.

Carroll, John B.; and Hatzikazakis, Michael V., to American Standard Inc. Electro-pneumatic governor for a compressed air-system. 5,035,582, Cl. 417-44.000.

Carroll, Robert G.; and Wise, Robin A., Jr., to Care Wise Medical Products Corporation. Probe and collimator for quick releasable mounting thereon. 5,036,201, Cl. 250-363.100.

Carter, Howard E.; Pugh, Joel A.; and Pierce, Byron C., to Messager Partners. System for providing automatic voice messaging in a digital network environment. 5,036,533, Cl. 379-59.000.

Carter, James C., to Davidson Textron Inc. Single cutter self-piercing cover assembly for airbag. 5,035,444, Cl. 280-732.000.

Carter, Timothy J. N.; and Bunce, Roger A., to National Research Development Corporation. Light absorption analyser. 5,035,508, Cl. 356-416.000.

Caruthers, Edward B., Jr.: *See—*
Berg, Eric; and Caruthers, Edward B., Jr., 5,036,366, Cl. 355-256.000.

CasChem, Inc.: *See—*
Brauer, Melvin; and Crawford, Clayton C., 5,036,143, Cl. 524-361.000.

Casciotti, Albert; Dery, Ronald A.; and Zimmerman, Richard H., to AMP Incorporated. Electrical connector for electrically interconnecting two parallel surfaces. 5,035,628, Cl. 439-66.000.

Casillo, Leonard G.: *See—*
Krom, Thomas J.; and Casillo, Leonard G., 5,036,427, Cl. 361-339.000.

Casio Computer Co., Ltd.: *See—*
Kanbara, Minoru, 5,036,231, Cl. 307-530.000.

Casolo Ginelli, Uberto: *See—*
Massa, Vincenzo; Merlo, Fabrizio; and Casolo Ginelli, Uberto, 5,035,924, Cl. 427-299.000.

Castellano, Maurizio, to Eniricerche S.p.A. Process for preparing a precursor of zirconium dioxide. 5,035,876, Cl. 423-608.000.

Castonguay, Roger N.: *See—*
Papallo, Thomas F., Jr.; and Castonguay, Roger N., 5,036,303, Cl. 335-17.000.

Caterpillar Inc.: *See—*
Braker, Brent L.; and Heisey, J. Barry, 5,035,209, Cl. 123-90.610.
Hudson, Gregory L.; Issa, Khaled M.; Richards, Randall R.; and Sprick, William L., 5,035,212, Cl. 123-323.000.
Lammers, Bryan G., 5,035,305, Cl. 188-71.500.

Catlow, Inc.: *See—*
Carmack, Paul D.; and Grantham, Rodger P., 5,035,271, Cl. 141-206.000.

Cayias, John L.; Holley, Susan M.; and Lichtenberger, Gunter J., to Oryz Energy Company. Redox gel process for more uniform fluid flow in formations. 5,035,287, Cl. 166-250.000.

Cayman Corporate Services: *See—*
Morales, Fernando, 5,036,389, Cl. 358-84.000.

CCL Industries: *See—*
Haase, Franklin D., 5,035,106, Cl. 53-470.000.

CCL Industries Inc.: *See—*
Moran, Michael J., 5,035,351, Cl. 222-394.000.

Centre de Recherches Metallurgiques-Centrum Voor Research in de Metallurgie: *See—*
Noville, Jean-Francois L.; and Wilmotte, Stephan H., 5,035,403, Cl. 266-114.000.

Centre D'Etude des Materiaux Organiques pour Technologies Avancees: *See—*
Senneron, Michel; Parrain, Gilbert; Rabilloud, Guy; and Sillion, Bernard, 5,036,111, Cl. 521-182.000.

Chaixmeca Sarl: *See—*
Clement, Jose ; and Guerard, Daniel, 5,036,205, Cl. 250-442.100.

Chakrabarti, Paritosh M.; Johnson, Harlan B.; Korach, Malcolm; Leatherman, Dennis D.; Reinhardt, Linda P.; and Simmons, Robert R., to PPG Industries, Inc. Active agent delivery device. 5,035,886, Cl. 424-78.000.

Chane-Ching, Jean-Yves; and Le Loarer, Jean-Luc, to Rhone-Poulenc Chimie. Novel cerium (IV) compounds. 5,035,834, Cl. 252-313.100.

Chang, Richard R.; and Rudnic, Edward M., to Schering Corporation. Potassium/magnesium supplement. 5,035,898, Cl. 424-474.000.

Chanzy, Henri D.; Rotzinger, Bruno; and Smith, Paul, to Du Pont de Nemours, E. I., and Company. Production of substantially linear highly crystalline polyolefins. 5,036,148, Cl. 526-169.200.

Chapelain, Jean-Claude; and Beaulieu, Daniel, to Otis Elevator Company. Support beam for elevator sheaves. 5,035,300, Cl. 187-1.00R.

Chapin, John T.; Jackson, Charles W.; Mensah, Thomas O.; and Reynolds, Mickey R., to AT&T Bell Laboratories. Guided vehicle system. 5,035,169, Cl. 89-1.340.

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Chapman, Derek D.; and DeBoer, Charles D., to Eastman Kodak Company. Infrared absorbing nickel-dithiolene dye complexes for dye-donor element used in laser-induced thermal dye transfer. 5,036,040, Cl. 503-227.000.

Chappell, Gilmore H., to Chappell International, Inc. Pump. 5,035,440, Cl. 280-201.000.

Chappell International, Inc.: *See—*
Chappell, Gilmore H., 5,035,440, Cl. 280-201.000.

Chase, Richard A., to Digital Equipment Corp. Burn-in pads for tab interconnects. 5,036,380, Cl. 357-70.000.

Chemical Waste Management, Inc.: *See—*
Halpern, Yuval, 5,035,840, Cl. 252-632.000.

Chen, Catherine S. H.; and Rodewald, Paul G., to Mobil Oil Corporation. Amide and sulfonic acid derivation of lower olefin oligomers. 5,035,818, Cl. 252-47.500.

Chen, Chung F. Structure of pipe plug. 5,035,265, Cl. 138-89.000.

Chen, Hsing-Yao; and Gorski, Richard M., to Zenith Electronics Corporation. Color crt system and process with dynamic quadrupole lens structure. 5,036,258, Cl. 315-382.000.

Chen, Michael S.; and Cook, Philip J., to Air Products and Chemicals, Inc. Process for removing oxygen from crude argon. 5,035,726, Cl. 55-16.000.

Chen, Michael S., to Air Products and Chemicals, Inc. Oxygen extraction from externally fired gas turbines. 5,035,727, Cl. 55-16.000.

Chen, Pan B. S. Ball hitting and receiving device. 5,035,427, Cl. 273-67.00R.

Chen, San Y.: *See—*
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Chen, Tsang J.; Nielsen, Paul L.; and Pavlisko, Joseph A., to Eastman Kodak Company. Toner fusing device and method of using the same. 5,035,927, Cl. 427-444.000.

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Chern, Mao-Jin J.: *See—*
Moss, Gaylord E.; Cohn, Brian D.; Chern, Mao-Jin J.; Cook, Lacy G.; and Ferrer, John J., 5,035,474, Cl. 350-3.700.

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Chesavage, Jay A., to MRI Technologies. Phantom for magnetic resonance imaging system. 5,036,280, Cl. 324-308.000.

Chesky, Kris S. Music vibration table and system. 5,035,235, Cl. 128-33.000.

Chester, Arthur W.: *See—*
Aufdembrink, Brent A.; Chester, Arthur W.; and Chu, Pochen, 5,036,159, Cl. 585-275.000.

Chevron Research Company: *See—*
MacKinnon, Hugh S., 5,035,824, Cl. 252-75.000.

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Rutledge, John M., 5,036,496, Cl. 367-35.000.

Chiang, Chao-Cheng. Mounting structure for a smoke exhauster. 5,035,398, Cl. 248-674.000.

Chien, Sze-Foo, to Texaco Inc. Method and apparatus for determining steam quality and/or flow rate from impact force and flow restriction data. 5,035,146, Cl. 73-861.040.

Chinn, Leland J.; Desai, Bipinchandra N.; and Mueller, Richard A., to G. D. Searle & Co. 5-lipoxygenase inhibitors. 5,036,105, Cl. 514-532.000.

Chip, Gerald K.; and Rudin, Alfred, to Tioxide Group Plc. Polymeric particles and their preparation. 5,036,109, Cl. 521-57.000.

Chisso Corp.: *See—*
Kozaki, Shyuichi; Okada, Masako; Funada, Fumiaki; Sasaki, Kei; Saito, Hideo; and Takeshita, Fusayuki, 5,035,928, Cl. 428-1.000.
Nakajima, Sadaaki; and Terakawa, Taiju, 5,035,595, Cl. 425-131.500.
Uemura, Katsuoki; Ando, Masaru; Yamauchi, Jun-Ichi; and Akutsu, Yoshinori, 5,035,849, Cl. 264-255.000.

Cho, Sung-Hee; Do, Jae-Young; and Kim, Jin-Ki, to SamSung Electronics Co., Ltd. Plural test mode selection circuit. 5,036,272, Cl. 324-158.00R.

Choi, Hoyeon: *See—*
Bilinski, Carl; Choi, Hoyeon; and Mussar, Keith, 5,035,902, Cl. 426-12.000.

Christianson, Tony. Regulator second stage for scuba. 5,035,238, Cl. 128-204.260.

Christie, Eugene F.: *See—*
Winton, Robert A.; and Christie, Eugene F., 5,035,940, Cl. 428-174.000.

Christopher, Gary. Closure for portable container. 5,035,344, Cl. 220-336.000.

Chrysler Corporation: *See—*
Wroblewski, Thomas R., 5,036,320, Cl. 341-26.000.

Chu, George H.: *See—*
Smestad, Thomas L.; Prowse, Daniel; Chu, George H.; and Hendricks, Diana M., 5,035,715, Cl. 623-16.000.

Chu, Pochen: *See—*
Aufdembrink, Brent A.; Chester, Arthur W.; and Chu, Pochen, 5,036,159, Cl. 585-275.000.

Chubb Fire Limited: *See—*
Allen, William P.; and Miles, Peter, 5,035,259, Cl. 137-488.000.

Chujo, Yoshiki: *See—*
Katsuno, Toshiyasu; Iguchi, Satoshi; and Chujo, Yoshiki, 5,035,358, Cl. 239-403.000.

Chung, Chang-Hwa: *See—*
Smith, Robert T.; and Chung, Chang-Hwa, 5,036,379, Cl. 357-69.000.

Chung, David Y.; and Johnston, John E., to Exxon Chemical Patents Inc. End-capped multifunctional viscosity index improver. 5,035,821, Cl. 252-51.50A.

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Debroy, Tapan K.; Chung, Ding Y.; Tjoe, Sioe-Heng A.; and Deschner, Craig R., 5,035,785, Cl. 204-181.700.

Chung, Frank K.: *See—*
Russell, Richard J.; Hunt, Freddie E.; and Chung, Frank K., 5,036,304, Cl. 335-209.000.

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Eckhardt, Claude; Hefti, Heinz; Meyer, Hans R.; and Weber, Kurt, 5,035,825, Cl. 252-95.000.
Isenring, Hans P.; Zehnder, Beat; and Ziegler, Hugo, 5,036,074, Cl. 514-277.000.
Jaeggi, Knut A., 5,036,058, Cl. 514-86.000.
Tobler, Hans; Ackermann, Peter; and Nyfeler, Robert, 5,036,084, Cl. 514-355.000.

Cichanski, Frank J. Monitor circuits for battery charging and other applications. 5,036,284, Cl. 324-433.000.

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Kokkeler, Franciscus; Idebro, Mats; Cigarini, Enzo; and Fioroli, Mario, 5,036,172, Cl. 219-10.55M.

Cincinnati Milacron Inc.: *See*—
Dinerman, Alex; and Steffens, Norman L., 5,035,605, Cl. 425-564.000.

City of Hope, The: *See*—
Morton, Jay, 5,035,343, Cl. 220-270.000.

Civin, Curt I., to Johns Hopkins University, The. Human stem cells and monoclonal antibodies. 5,035,994, Cl. 435-2.000.

Clark, Bryan K.: *See*—
Goldberg, Paul R.; Clark, Bryan K.; Finegan, Joel D.; and Guerra, Robert, 5,036,511, Cl. 369-284.000.

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Clark, David M.; and Dogterom, Ronald J., to Shell Oil Company. Crystalline aluminophosphate compositions. 5,035,870, Cl. 423-277.000.

Clear Flow, Inc.: *See*—
Rosberg, Louis; Mehta, Devendra V.; Rosberg, Aaron; and Billbury, Ron, 5,035,799, Cl. 210-232.000.

Clement, Jose ; and Guerard, Daniel, to Chaixmeca Sarl. Apparatus for the transfer and in-situ reactions under a controlled atmosphere, of specimens for transmissive electron microscopy. 5,036,205, Cl. 250-442.100.

Clementi, Daniel M.: *See*—
Hohmann, Jere W.; Rogers, Bruce J.; Ransom, Stephen A.; and Clementi, Daniel M., 5,036,216, Cl. 309-269.000.

clnZall Corporation: *See*—
Stowe, Gene B., 5,035,804, Cl. 210-671.000.

Cloonan, Thomas J.; Jewell, Jack L.; McCormick, Frederick B., Jr.; Miller, David A. B.; and Prise, Michael E., to AT&T Bell Laboratories. Optical apparatus for combining light beam arrays having different wavelengths. 5,036,512, Cl. 370-2.000.

Coaker, A. William M.; and Vyvoda, Josef C., to B. F. Goodrich Company, The. Flame and smoke retardant cable insulation and jacketing compositions. 5,036,121, Cl. 524-100.000.

Coast Foundry & Manufacturing Co., Inc.: *See*—
Antunez, Bruce A., 5,035,257, Cl. 137-414.000.

Coates, Bradley J., to Dow Corning Wright. Patella track cutter and guide. 5,035,699, Cl. 606-86.000.

Coates, Carl T.; and Boucher, Dennis G., to Universal Instruments Corporation. Isolating a first component to be pickup from other components on a vibratory feeder. 5,035,316, Cl. 198-459.000.

Coates, Ian H., to Glaxo Group Limited. Piperidinyl indoles for migraine treatment. 5,036,078, Cl. 514-323.000.

Cocks, Franklin H.; and Farner, Peter W. Glass plate illumination device sign with integral electrodes of particular thermal resistance. 5,036,243, Cl. 313-39.000.

Codenoll Technology Corporation: *See*—
Dutt, Bulusu V., 5,035,480, Cl. 350-96.150.

CODEX Corp.: *See*—
Theobald, Kevin B., 5,036,489, Cl. 365-73.000.

Cohen, Yoram, to University of California, The Regents of the. High yield water-soluble polymer silica separation resins. 5,035,803, Cl. 210-656.000.

Cohn, Brian D.: *See*—
Moss, Gaylord E.; Cohn, Brian D.; Chern, Mao-Jin J.; Cook, Lacy G.; and Ferrer, John J., 5,035,474, Cl. 350-3.700.

Colgate-Palmolive Company: *See*—
Durbut, Patrick J.; Mondin, Myriam M.; and Broze, Guy J., 5,035,826, Cl. 252-121.000.
Maaser, Heidrun E., 5,035,814, Cl. 252-8.700.

Collagen Corporation: *See*—
Smestad, Thomas L.; Prowse, Daniel; Chu, George H.; and Hendricks, Diana M., 5,035,715, Cl. 623-16.000.

Colle, Roberto; Camaggi, Giovanni; Gozzo, Franco; Ratti, Giuseppina; Mirenna, Luigi; and Garavaglia, Carlo, to Montedison S.p.A. Azolyl-derivatives endowed with antifungal activity. 5,036,094, Cl. 514-383.000.

Collier, John C.; and Reeves, Stuart J., to ITT Industries Limited. Shielded electrical connectors. 5,035,649, Cl. 439-607.000.

Collier, John C.: *See*—
Van-Santbrink, Ronald; Collier, John C.; and Lee, David, 5,035,641, Cl. 439-329.000.

Collingborn, Peter A. G., to Lucas Industries. Fuel pumping apparatus. 5,035,587, Cl. 417-462.000.

Collins, Imack L.: *See*—
Sadler, Jeffery G.; Tuggle, Lloyd H.; and Collins, Imack L., 5,035,586, Cl. 417-363.000.

Combo Corporation: *See*—
Morris, Jerry R.; and Squires, George A., 5,035,025, Cl. 16-97.000.

Combustion Engineering, Inc.: *See*—
Riley, Brian, 5,035,961, Cl. 429-30.000.

Commonwealth of Australia, The: *See*—
Scott, Owen S., 5,036,211, Cl. 250-495.100.

Communications Research Laboratory Ministry of Post and Telecommunications: *See*—
Imae, Michito; and Miki, Chihiro, 5,036,330, Cl. 342-357.000.

Compagnie Europeenne de Composants Electroniques LCC: *See*—
Delalande, Francois; and Boulloy, Georges, 5,036,433, Cl. 361-529.000.

Comparetto, John E., to Ohio Medical Instrument Co., Inc. Arcuate osteotomy blade. 5,035,698, Cl. 606-82.000.

Comte, Marie-Therese; Gueremy, Claude; Malleron, Jean-Luc; Mignani, Serge; Peyronel, Jean-Francois; and Truchon, Alain, to Rhone-Poulenc Sante. Derivatives of (AZA) naphthalensultam, their preparation and compositions containing them. 5,036,075, Cl. 514-293.000.

Conlon, Edward J.; Prabhu, Ashok N.; Boardman, Simon M.; and Pendrick, Valerie A., to David Sarnoff Research Center, Inc. Manufacture of printed circuit boards. 5,035,939, Cl. 428-137.000.

Connolly, Daniel T.: *See*—
Olander, Jitka V.; Connolly, Daniel T.; Adams, Steven P.; and Feder, Joseph, 5,036,003, Cl. 435-70.100.

Consolidated Ceramic Products, Inc.: *See*—
Johnson, Howard B., 5,036,029, Cl. 501-121.000.

Continental White Cap, Inc.: *See*—
Heilman, Robert J.; and Iler, H. Darrell, 5,035,341, Cl. 215-230.000.

Cook, Christopher M., to IMI Cornelius Inc. Beverage cooling and pumping system. 5,035,121, Cl. 62-389.000.

Cook Imaging Corporation: *See*—
Sovak, Milos; and Ranganathan, Ramachandran, 5,035,877, Cl. 424-5.000.

Cook Incorporated: *See*—
Giantureo, Cesare; and Osborne, Thomas A., 5,035,706, Cl. 606-198.000.

Cook, Kane D.: *See*—
Magid, Hillel; Shankland, Ian R.; Wilson, David P.; Cook, Kane D.; and Lund, Earl A. E., 5,035,831, Cl. 252-171.000.

Cook, Lacy G.: *See*—
Moss, Gaylord E.; Cohn, Brian D.; Chern, Mao-Jin J.; Cook, Lacy G.; and Ferrer, John J., 5,035,474, Cl. 350-3.700.

Cook, Philip J.: *See*—
Chen, Michael S.; and Cook, Philip J., 5,035,726, Cl. 55-16.000.

Cooper, Edward W.; and Dewberry, Peter, to Acco World Corporation. Concealed rivet element and setting method for ring binder construction. 5,035,526, Cl. 402-75.000.

Cooper Industries, Inc.: *See*—
Garnham, David, 5,035,258, Cl. 137-454.200.

Cooper, Patricia: *See*—
Gross, Clifford; and Cooper, Patricia, 5,035,392, Cl. 248-422.200.

Cooper, Stephen R. W.: *See*—
Munch, Carl A.; Cooper, Stephen R. W.; and Rymut, Michael J., 5,036,275, Cl. 324-207.170.

Cooper Tire & Rubber Company: *See*—
Davis, Paul J., 5,035,567, Cl. 414-751.000.

Copermill Limited: *See*—
Hengelmolen, Adrianus J., 5,035,402, Cl. 266-88.000.

Coran, Aubert Y., to Monsanto Company. Rubber blends. 5,036,132, Cl. 524-526.000.

Coran, Aubert Y., to Monsanto Company. Rubber compositions containing a vinylpyridine-butadiene interpolymer co-activator. 5,036,133, Cl. 524-526.000.

Corbett, William D.; and Sheaffer, Benjamin L., to Brunswick Corporation. Evaporable foam pattern assembly for casting a housing for a rotary engine. 5,035,276, Cl. 164-34.000.

Corda, Albert J.: *See*—
Cain, R. Neal; and Corda, Albert J., 5,036,323, Cl. 342-6.000.

Cordell, Steve. Process and means for selftest of RAMs in an electronic device. 5,036,516, Cl. 371-16.100.

Cornell Research Foundation, Inc.: *See*—
Sanford, John C.; Wolf, Edward D.; and Allen, Nelson K., 5,036,006, Cl. 435-172.100.

Cornwall, Kenneth R. Coupling for concrete wall or floor mounting. 5,035,097, Cl. 52-220.000.

Costain Building Products Limited: *See*—
Mitchell, Samuel B. H., 5,035,538, Cl. 405-151.000.

Costantino, Cirillo L.: *See*—
Le, Duc N.; Yue, Lordson L.; Costantino, Cirillo L.; Chengson, David P.; and Khan, Aurangzeb K., 5,036,528, Cl. 375-119.000.

Costello, Christine A.; and Dickenson, John B., to Air Products and Chemicals, Inc. Triblock amide fluorosurfactants. 5,035,841, Cl. 260-404.500.

Cotney, Garland D., to Motorola, Inc. Hold-down clamp with mult-fingered interchangeable insert for wire bonding semiconductor lead frames. 5,035,034, Cl. 29-25.010.

Cotton, David R.: *See*—
Pathak, Vijay K.; and Cotton, David R., 5,036,377, Cl. 357-38.000.

Coudurier, Pierre; Boutte, Pierre; Romeuf, Patrick; Tronchon, Paul; and Auffranc, Michel, to Groupement pour L'Automatisation de la Production Gap; and Coudurier, Pierre. Planetarium. 5,035,623, Cl. 434-286.000.

Covert, Kathleen L.: *See*—
Bindra, Perminder; Covert, Kathleen L.; and Light, David N., 5,035,778, Cl. 204-94.000.

Covino, Josephine, to United States of America, Navy. Bonding agents for thermite compositions. 5,035,756, Cl. 149-37.000.

Cowen, Russell A., to Tecumseh Products Company. Method of installing a valve assembly in a compressor. 5,035,050, Cl. 29-888.020.

Cowing, Richard W., to Sturdi-Built Wood Products Limited. Device for assembling louver windows and doors. 5,035,046, Cl. 29-714.000.

Cowley, Martyn B.: *See*—
Lissaman, Peter B. S.; Morgan, W. R.; Cowley, Martyn B.; Sink, Charles J.; and Watson, William D., 5,035,382, Cl. 244-190.000.

Cranford, Stephen: *See*—
Hornby, Michael J.; Spiers, Dean; and Cranford, Stephen, 5,035,224, Cl. 123-470.000.

Craun, Gary P.: *See*—
Kunz, Barbara L.; and Craun, Gary P., 5,036,134, Cl. 524-560.000.

Crawford, Clayton C.: *See*—
Brauer, Melvin; and Crawford, Clayton C., 5,036,143, Cl. 524-361.000.

Cremona, Lorenzo, to Angelo Cremona & Figlio S.p.A. Device for cutting and stacking strips of wood. 5,035,164, Cl. 83-80.000.

Crittenden, James F.; and Purtell, George J., to C. R. Bard, Inc. Catheter exchange system with detachable luer fitting. 5,035,686, Cl. 604-96.000.

Crofutt, Thomas A.: *See*—
Miller, Dale W.; and Crofutt, Thomas A., 5,035,176, Cl. 101-148.000.

Cronquist, Tom A. Gull wing cart apparatus. 5,035,438, Cl. 280-79.500.

Crossman, Stephen A.; and Lloyd, John R. Packaging having detachable coupon compartment. 5,035,515, Cl. 383-38.000.

Crosspoint Systems, Inc.: *See*—
Jackson, Joseph M., 5,036,160, Cl. 174-33.000.

Crowell Corporation, The: *See*—
Kipnees, Jerome J.; and Raszewski, Lewis R., 5,035,078, Cl. 47-24.000.

Crucible Societe Anonyme: *See*—
van der Walt, Nicolaas T., 5,036,277, Cl. 324-235.000.

Csepel Autogyar: *See*—
Simonyi, Sandor; Torocsik, Laszlo ; Toth, Istvan; and Valoczi, Gyorgy, 5,035,113, Cl. 60-390.000.

CSIR: *See*—
Maree, Johannes P., 5,035,807, Cl. 210-711.000.

Culp, Edwin C. Method and device for winterizing boat engines. 5,035,208, Cl. 123-41.140.

Curtin Matheson Scientific, Inc.: *See*—
Woodward, William S., 5,035,147, Cl. 73-861.280.

Cushman Inc.: *See*—
Meyer, Allen D.; and Hicks, John E., 5,035,108, Cl. 56-13.400.

Cutshall, Tony A.: *See*—
Alchas, Paul G.; Augello, Frank A.; Brooks, Christopher J.; Cutshall, Tony A.; DiPisa, Joseph A., Jr.; Williams, Stuart K.; Gabel, Jonathan B.; Mulhauser, Paul J.; Prais, Wes; Jarrell, Bruce E.; and Rose, Deborah G., 5,035,708, Cl. 623-1.000.

D. S. Brown Company, Inc.: *See*—
Brown, Howard R., 5,035,533, Cl. 404-64.000.

Dae Kyo Limited: *See*—
Kang, Yung J., 5,035,666, Cl. 446-118.000.

Daftary, Fereidoun. Anatomical restoration dental implant system with improved healing cap and abutment. 5,035,619, Cl. 433-173.000.

Dai Nippon Insatsu K.K.: *See*—
Yamada, Tsutoo; Morizumi, Kenichi; Kamegai, Yuji; Kanno, Yasushi; and Shibuya, Takemi, 5,035,931, Cl. 428-35.700.

Dai Nippon Insatsu Kabushiki Kaisha: *See*—
Kanto, Jumpei J. K.; Saito, Hitoshi H. S.; Eguchi, Hiroshi H. E.; and Nakamura, Masayuki M. N., 5,036,041, Cl. 503-227.000.
Kitsuki, Kengo, 5,035,325, Cl. 206-459.000.

Daido Metal Company Ltd.: *See*—
Iijima, Yoshio, 5,035,051, Cl. 29-898.054.

Daikin Industries, Ltd.: *See*—
Tamura, Kohji; Omure, Yukio; and Ide, Satoshi, 5,035,828, Cl. 252-170.000.
Tamura, Koji; Kashiwagi, Hiroshi; and Noguchi, Masahiro, 5,035,823, Cl. 252-67.000.
Ueda, Tomoaki, 5,036,475, Cl. 364-518.000.

Daimler-Benz AG: *See*—
Leiber, Heinz; Schneider, Werner; Waxenberger, Erich; Klarer, Martin; Zimmer, Richard; and Burckhardt, Manfred, 5,035,295, Cl. 180-140.000.

Daimler-Benz Aktiengesellschaft: *See*—
Zweigart, Gerhard, 5,035,461, Cl. 296-107.000.

Daines, John W.; Benn, Bryan L.; and Stoll, Walter H., to Rolls-Royce plc; and MTU Motoren-und Turbinen-Union Munchen GmbH. Friction bonding apparatus. 5,035,411, Cl. 269-231.000.

Dainippon Ink and Chemicals, Inc.: *See*—
Kiyonari, Toshiyuki; Hirabayashi, Satoshi; and Kidokoro, Naoto, 5,035,983, Cl. 430-346.000.

Daish, Stephen R., to British Nuclear Fuels Plc. Recombination catalyst. 5,035,875, Cl. 423-580.000.

Daiwa Seiko Inc.: *See*—
Kaneko, Kyoichi, 5,035,374, Cl. 242-264.000.

Dallabetta, Kyle A.; Lamberty, Bernard J.; and Voyce, Kenneth G., to Boeing Company, The. Adaptive polarization combiner. 5,036,331, Cl. 342-361.000.

Daly, Paul D.; and McArthur, Robert A., to Siemens Automotive L.P. Engine throttle blade sealing. 5,035,214, Cl. 123-337.000.

Damongeot, Alain, to Aerospatiale Societe Nationale Industrielle. Blade for an aircraft rotor and rotor comprising such a blade. 5,035,577, Cl. 416-223.00R.

Dang Vu, Quang; Huin, Roland; and Euzen, Jean-Paul, to Institut Francais du Petrole. Reactor and reaction method with internal heat control by hollow heat exchanger plates. 5,035,867, Cl. 422-200.000.

Daniel, Jose: *See*—
Rocha, Joaquim; and Daniel, Jose, 5,035,672, Cl. 452-141.000.

Daniele, Zetti: *See*—
Carlo, Gatti; and Daniele, Zetti, 5,035,026, Cl. 16-288.000.

Daniels, Edward P., Jr.: *See*—
Munson, Gerald L.; Daniels, Edward P., Jr.; and Mallozzi, Joseph D., 5,035,625, Cl. 434-332.000.

Daniels, James W.; and Hansen, Karl A., to Boeing Company, The. Self cleaning liquid level detector. 5,035,140, Cl. 73-290.00V.

Daniels, Thomas C.; Jeruzal, Patricia M.; and Bettle, Griscom, III, to Tropicana Products, Inc. Shipper display. 5,035,323, Cl. 206-386.000.

Danilewicz, John C.; and James, Keith, to Pfizer Inc. Cycloalkyl-substituted glutaramide diuretic agents. 5,036,104, Cl. 514-513.000.

Dannenberg, Paul H., to Honeywell Inc. Single oscillator FSK pulsed radar receiving transmitter. 5,036,327, Cl. 342-201.000.

Danro Tool Company Inc.: *See*—
Rocha, Joaquim; and Daniel, Jose, 5,035,672, Cl. 452-141.000.

D'Aquila, Anthony: *See*—
Smart, Charles F.; and D'Aquila, Anthony, 5,035,353, Cl. 227-2.000.

Datalight Limited: *See*—
Jonsen, Paul, 5,036,279, Cl. 324-307.000.

Dataline Technologies GmbH: *See*—
Kaneda, Takashi; and Villwock, Thomas, 5,036,429, Cl. 361-392.000.

Date, Yozo; and Tsumura, Toshihiro, to Suehiro Seiko Kabushiki Kaisha. Chain saw guide bar. 5,035,058, Cl. 30-387.000.

Datron Systems Incorporated: *See*—
Thomas, Delmer L., 5,036,332, Cl. 342-361.000.

Datta, Amitava: *See*—
Nathasingh, Davidson M.; Martis, Ronald J. J.; and Datta, Amitava, 5,035,755, Cl. 148-304.000.

Dautremont-Smith, William C.; Katz, Avishay; Koszi, Louis A.; Segner, Bryan P.; and Thomas, Peter M., to AT&T Bell Laboratories. Rapid thermal processing method of making a semiconductor device. 5,036,023, Cl. 437-184.000.

Davey, Kenneth J., to Fluid Technology Limited. Line pressure regulator. 5,035,260, Cl. 137-505.180.

David Sarnoff Research Center, Inc.: *See*—
Conlon, Edward J.; Prabhu, Ashok N.; Boardman, Simon M.; and Pendrick, Valerie A., 5,035,939, Cl. 428-137.000.

Davidson Textron Inc.: *See*—
Carter, James C., 5,035,444, Cl. 280-732.000.

Davis, Baruch J.: *See*—
Oster, Gerald; and Davis, Baruch J., 5,035,997, Cl. 435-6.000.

Davis, Jeffrey B., to National Semiconductor Corporation. Output buffer circuit with output voltage sensing for reducing switching induced noise. 5,036,222, Cl. 307-443.000.

Davis, Lorne A., Jr.; Hart, Timothy J.; Moss, Robert M.; and Pepin, Gregory P., to Texaco Inc. Earthen core analyzing means and method. 5,036,193, Cl. 250-255.000.

Davis, Neil: *See*—
Rorabaugh, Dale A.; Davis, Neil; Mansfield, George A., Jr.; and Brancaccio, Vince, 5,035,500, Cl. 351-226.000.

Davis, Paul J., to Cooper Tire & Rubber Company. Unloader for tire building system. 5,035,567, Cl. 414-751.000.

Davis, Robert E.: *See*—
Blatter, Albert; and Davis, Robert E., 5,035,254, Cl. 137-85.000.

Dayco Products, Inc.: *See*—
Green, Nancy M.; and Foley, Mark P., 5,035,679, Cl. 474-135.000.

de La Chapelle, Michael: *See*—
Friedenthal, Kenneth J.; de La Chapelle, Michael; and Hsu, Hui-Pin, 5,035,375, Cl. 244-3.120.

Dear, Aiden R.: *See*—
Denham, Keith; and Dear, Aiden R., 5,035,129, Cl. 72-30.000.

DeBerry, Blake T.: *See*—
Watkins, Bruce J.; and DeBerry, Blake T., 5,035,289, Cl. 166-344.000.

Deboeck, Arthur M.; Baudier, Philippe R.; Fossion, Jacques J.; and Maes, Paul J., to Pharlyse S.A. Societe Anonyme. Pharmaceutical method and preparation containing indomethacin. 5,036,100, Cl. 514-420.000.

DeBoer, Charles D.; and Evans, Steven, to Eastman Kodak Company. Infrared absorbing oxonol dyes for dye-donor element used in laser-induced thermal dye transfer. 5,035,977, Cl. 430-200.000.

DeBoer, Charles D.: *See*—
Chapman, Derek D.; and DeBoer, Charles D., 5,036,040, Cl. 503-227.000.

Debroy, Tapan K.; Chung, Ding Y.; Tjoe, Sioe-Heng A.; and Deschner, Craig R., to Du Pont de Nemours, E. I., and Company. Nonionic surfactant as a pigment dispersant and film build additive. 5,035,785, Cl. 204-181.700.

Dederer, Jeffery T.; and Hackworth, Donald T., to Westinghouse Electric Corp. Segmented interlayer spacer bars for multilayer superconducting solenids. 5,036,305, Cl. 335-216.000.

Deep South Crane & Rigging Co.: *See*—
Juergens, Dieter C., 5,035,337, Cl. 212-196.000.

Defibaugh, George R.; and Mosser, Benjamin H., III, to AMP Incorporated. Electrical connector having an inner metal shield. 5,035,650, Cl. 439-609.000.

Degler, Peter; and Kramer, Bernhard, to Kunststofftechnik Debler GmbH. Method of making a breast prosthesis. 5,035,758, Cl. 156-61.000.

Degott, Pierre: *See*—
Amon, Albert; Boksanyi, Laszlo K.; and Degott, Pierre, 5,035,743, Cl. 106-21.000.

Degussa AG: *See*—
Fehrenbach, Gustav W.; and Peukert, Doris, 5,035,513, Cl. 374-161.000.

Degussa Aktiengesellschaft: *See*—
Neubecker, Karlheinz; Rohde, Cordt; and Welzig, Gerhard, 5,035,611, Cl. 432-176.000.
Speer, Dietrich; Kiss, Akos; and Kleinschmit, Peter, 5,035,746, Cl. 106-438.000.

Delalande, Francois; and Boulloy, Georges, to Compagnie Europeenne de Composants Electroniques LCC. Connection strip for anodes of electrolytic capacitors and method for the fabrication of electrolytic capacitors using such a strip. 5,036,433, Cl. 361-529.000.

Delalande S.A.: *See—*
Jarreau, Francois X.; Rovei, Vincenzo; Koenig, Jean-Jacques; and Schoffs, Alain R., 5,036,090, Cl. 514-376.000.
Jarreau, Francois X.; Rovei, Vincenzo; Koenig, Jean-Jacques; and Schoffs, Alain R., 5,036,091, Cl. 514-376.000.

Del Fabro, Giorgio; and Del Fabro, Marcello, to M.E.P. Machine Elettroniche Piegatrici SpA. Antirotation straightening machine. 5,035,130, Cl. 72-162.000.

Del Fabro, Marcello: *See—*
Del Fabro, Giorgio; and Del Fabro, Marcello, 5,035,130, Cl. 72-162.000.

Dell USA Corporation: *See—*
Lunsford, David R.; and Llamas, Joe E., 5,036,481, Cl. 364-708.000.

Delorme, Daniel: *See—*
Girard, Yves; Hamel, Pierre; and Delorme, Daniel, 5,036,067, Cl. 514-224.800.

Del Rosario, Chris, to Ames Rubber Corporation. Fluoroelastomer coated fuser roll. 5,035,950, Cl. 428-421.000.

DeLuca, Hector F.; Schnoes, Heinrich K.; Sicinski, Rafal R.; and Tanaka, Yoko. Process for the preparation of 1 alpha,25-dihydroxylated vitamin $D_2$ and related compounds. 5,036,061, Cl. 514-167.000.

De Luca, Paul V: *See—*
Siemon, John A.; and De Luca, Paul V, 5,035,645, Cl. 439-532.000.

DeMarco, John W.: *See—*
Sikorski, Charles F.; and DeMarco, John W., 5,035,871, Cl. 423-305.000.

den Haan, Petrus A. M.; and Hopmans, Franciscus P. M., to U.S. Philips Corporation. Multi-processor computer system with distributed memory and an interprocessor communication mechanism, and method for operating such mechanism. 5,036,459, Cl. 364-200.000.

Denham, Keith; and Dear, Aiden R., to Avdel Systems Limited. Repetition riveting apparatus. 5,035,129, Cl. 72-30.000.

Dennis, Wendell: *See—*
Anderson, James E.; Dennis, Wendell; and Powers, Richard, 5,035,671, Cl. 452-37.000.

Dennison, Everett G., Jr. Portable system and method for continuously monitoring protective clothing for detecting and signaling the occurrence of a breach therein. 5,036,309, Cl. 340-540.000.

Denton, Thomas A. Cleaning supplies caddy. 5,035,321, Cl. 206-225.000.

Denzin, Dirk E.; Lull, Robert E.; and Schommer, Alan J., to Vollrath Company, Inc., The. Receptacle adaptable for nested stacking. 5,035,327, Cl. 206-518.000.

De Peyer, Jacques: *See—*
Baumgarth, Manfred; Gericke, Rolf; Bergmann, Rolf; De Peyer, Jacques; and Lues, Ingeborg, 5,036,068, Cl. 514-230.500.

DeRosa, Thomas F.; Kaufman, Benjamin J.; and Jennejahn, Rosemary J., to Texaco, Inc. Dispersant, VI improver, additive and lubricating oil composition containing same. 5,035,819, Cl. 252-49.900.

Dery, Ronald A.: *See—*
Casciotti, Albert; Dery, Ronald A.; and Zimmerman, Richard H., 5,035,628, Cl. 439-66.000.

Desai, Bipinchandra N.: *See—*
Chinn, Leland J.; Desai, Bipinchandra N.; and Mueller, Richard A., 5,036,105, Cl. 514-532.000.

DeSanti, Pierluigi: *See—*
Barillari, Piero; DeSanti, Pierluigi; Galderesi, Mario; Marchi, Carlo A.; Natili, Franco; Rossiello, Vincenzo; Settembre, Donato; and Urbinati, Francesco, 5,036,314, Cl. 340-717.000.

DeSantis, John A.: *See—*
Stein, Andrew M.; and DeSantis, John A., 5,035,173, Cl. 99-323.700.

Deschner, Craig R.: *See—*
Debroy, Tapan K.; Chung, Ding Y.; Tjoe, Sioe-Heng A.; and Deschner, Craig R., 5,035,785, Cl. 204-181.700.

Desco Industries, Inc.: *See—*
Williams, Eric A., 5,036,423, Cl. 361-212.000.

DesJardins, Paul R.: *See—*
Glaser, Edward L.; DesJardins, Paul R.; Caldwell, Douglas W.; and Glaser, Eliot D., 5,036,457, Cl. 364-200.000.

Deutsche Thomson-Brandt GmbH: *See—*
Gleim, Gunter, 5,036,505, Cl. 369-44.250.
Kaaden, Jurgen; and Uhde, Dietmar, 5,036,409, Cl. 360-51.000.

de Vries, Gerrit, to Stork Pompen BV. Pump housing, mould parts of a mould wall for a pump housing and method of manufacturing a pump housing. 5,035,574, Cl. 415-200.000.

Devries, William: *See—*
Medemblik, John J.; and Devries, William, 5,035,543, Cl. 406-39.000.

Dewberry, Peter: *See—*
Cooper, Edward W.; and Dewberry, Peter, 5,035,526, Cl. 402-75.000.

Dhyanchand, John J.; and Nguyen, Vietson M., to Sundstrand Corporation. Power supply and method for producing high voltage high power outputs in response to variable voltage DC inputs. 5,036,449, Cl. 363-15.000.

Dia-Ichi Kogyo Seiyaku Co., Ltd.: *See—*
Saeki, Shuji; Suehiro, Masatoshi; Echigo, Masashi; Okada, Susumu; and Sakuraba, Masami, 5,035,837, Cl. 252-512.000.

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Chase, Richard A., 5,036,380, Cl. 357-70.000.
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Eichenlaub, Jesse B., 5,036,385, Cl. 358-3.000.

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Simonette, Dallas W., 5,035,580, Cl. 417-34.000.

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Clark, David M.; and Dogterom, Ronald J., 5,035,870, Cl. 423-277.000.

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Kinnick, John F.; and Lashier, Frank E., Jr., 5,035,274, Cl. 157-1.100.

Donahue, Kenneth J., to Betts Packaging Inc. Multi-component striping paste dispenser. 5,035,349, Cl. 222-107.000.

Dorn, Hubert: *See*—
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Dorsch, Dieter; Eidenschink, Rudolf; Rieger, Bernhard; and Marowsky, Gerd, to Merck Patent Gesellschaft mit Beschrankter Haftung. Compositions forming hydrogen bridges. 5,035,839, Cl. 252-587.000.

Dorsett, Michael W., to AB Volvo. Bending apparatus for bending a margin flange. 5,035,136, Cl. 72-450.000.

Dougherty, David P. Inner tie rod tool. 5,035,162, Cl. 81-124.400.

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Dougherty, Patrick S. Forced foil sail. 5,035,194, Cl. 114-102.000.

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Watanabe, Tadahiko; Doutsu, Tsuyoshi; Shobu, Kazuhisa; and Kai, Yukio, 5,036,028, Cl. 501-96.000.

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Au, Andrew T., 5,036,154, Cl. 549-531.000.
Beaver, Richard N.; Byrd, Carl E.; and Kelly, Stephen L., 5,035,789, Cl. 204-290.00R.
Martinez, Eloy C., 5,036,118, Cl. 523-212.000.
Zakich, Paul, 5,035,606, Cl. 425-569.000.

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Blank, Lynne M. B.; Boyce, Thomas D.; and White, William C., 5,035,892, Cl. 424-443.000.
Braun, Michael C., 5,035,890, Cl. 424-401.000.
Chung, Kyuha; Wright, Antony P.; and Yeh, Ming-Hsiung, 5,036,117, Cl. 522-172.000.
Himstedt, Alan L., 5,036,131, Cl. 524-786.000.
Kosal, Jeffrey A., 5,035,827, Cl. 252-135.000.
Lee, Chi-Long; and Ulman, Katherine L., 5,035,894, Cl. 424-448.000.
Lutz, Michael A.; and Scheibert, Kristen A., 5,036,114, Cl. 522-20.000.

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Coates, Bradley J., 5,035,699, Cl. 606-86.000.

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Watkins, Bruce J.; and DeBerry, Blake T., 5,035,289, Cl. 166-344.000.

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Drosd, Robert M., to Bipolar Integrated Technology, Inc. VLSI bipolar transistor process. 5,036,016, Cl. 437-31.000.

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Wang, Chia-Lin J.; and Wuonola, Mark A., 5,036,092, Cl. 514-376.000.
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Ogawa, Motosuke; Fukazawa, Hiromitsu; and Ogawa, Yasumasa, 5,035,833, Cl. 252-182.240.

Dubail, Alain; Pailhes, Alain; and Schulcz, Francis, to Electricite de France (Service National). Device for counting particles of ionizing radiation and its application to implementing a method of measuring the rate of leakage between the primary and secondary circuits of a steam generator. 5,036,200, Cl. 250-356.200.

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Wegner, Gerhard; Schouten, Arend J.; Duda, Gisela; and Arndt, Thomas, 5,035,762, Cl. 156-230.000.
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An, Moon Houy, 5,035,496, Cl. 350-605.000.

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Spielberger, Richard K.; and Dunaway, Thomas J., 5,036,163, Cl. 174-52.400.

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Kerrigan, James E.; and McMenamin, John E., 5,035,040, Cl. 29-505.000.
Meyer, Robert J., 5,035,354, Cl. 227-7.000.

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Goethals, Eric; Halkes, Sebastianus J.; and Koolstra, Robert B., 5,035,783, Cl. 204-157.670.
Kleingeld, Adriaan; Kooijmans, Kees R.; and Kragtwijk, Wilhelmus F., 5,035,860, Cl. 422-61.000.

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Chanzy, Henri D.; Rotzinger, Bruno; and Smith, Paul, 5,036,148, Cl. 526-169.200.
Debroy, Tapan K.; Chung, Ding Y.; Tjoe, Sioe-Heng A.; and Deschner, Craig R., 5,035,785, Cl. 204-181.700.
El-Sayed, Lyla M.; and Page, Loretta Ann G., 5,035,972, Cl. 430-114.000.
Fabricius, Dietrich M.; and Hoyte, Otho P., 5,035,990, Cl. 430-567.000.
Hasircoglu, Alexander W.; and Humphrey, David T., 5,035,634, Cl. 439-157.000.
Hempton, Robert F., 5,035,761, Cl. 156-161.000.
Hollberg, Peter J.; and Swann, James C., 5,035,773, Cl. 162-347.000.
Houle, William A.; and Tufano, Thomas P., 5,035,992, Cl. 430-569.000.
Lerou, Jan J., 5,036,036, Cl. 502-317.000.
Merchant, Abid N., 5,035,830, Cl. 252-171.000.
Nebe, William J.; and Osborne, James J., 5,035,980, Cl. 430-281.000.
Nelson, Thomas L., 5,035,110, Cl. 57-208.000.
Patel, Kanti D., 5,035,656, Cl. 439-733.000.
Schonbach, Dave I., 5,036,262, Cl. 318-38.000.
Spinelli, Harry J., 5,036,139, Cl. 525-326.500.
Subramanian, Munirpallam A., 5,036,043, Cl. 505-1.000.

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Jonischus, Jurgen, 5,035,154, Cl. 74-213.000.

Duran, Andrew J., to Infrared Systems, Inc. Method and apparatus for synchronously demodulating detector output of a radiometer. 5,036,289, Cl. 328-117.000.

Durand, David, to Key-Tech, Inc. Printed circuit board. 5,036,128, Cl. 524-440.000.

Durand, Jean-Pierre: *See*—
Jarrin, Jacques; Robine, Magali; and Durand, Jean-Pierre, 5,035,822, Cl. 252-51.50R.

Durbut, Patrick J.; Mondin, Myriam M.; and Broze, Guy J., to Colgate-Palmolive Company. Liquid crystal detergent composition. 5,035,826, Cl. 252-121.000.

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Putnam, Peter H.; and Durcan, Michael P., 5,035,088, Cl. 51-165.710.

Durckheimer, Walter: *See*—
Lattrell, Rudolf; Durckheimer, Walter; and Seibert, Gerhard, 5,036,063, Cl. 514-192.000.

Durso, Joseph M. Golf swing training mat. 5,035,433, Cl. 273-187.00A.

Durtschi, William G.: *See*—
Stroze, Mark S.; and Durtschi, William G., 5,035,170, Cl. 91-486.000.

Dutt, Bulusu V., to Codenoll Technology Corporation. Star-couplers with biconical mixing elements and methods for making the same. 5,035,480, Cl. 350-96.150.

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Heinemann, Ulrich; Kleefeld, Gerd; Dutzmann, Stefan; and Hanssler, Gerd, 5,036,085, Cl. 514-361.000.

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Dickinson, Ben W. O.; Anderson, Randall R.; Dickinson, Robert W.; Dickinson, Eric W.; and Dykstra, Herman, 5,035,285, Cl. 166-65.100.

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Bender, Richard; and Bretfeld, Anton, 5,035,179, Cl. 102-202.500.

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Lahtinen, Matti; and Pyorre, Ismo, 5,036,268, Cl. 322-28.000.

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Kopach, Robert J., 5,035,800, Cl. 210-469.000.

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Barnett, Anthony M.; Gray, Colin J.; and Baker, Julie, 5,035,978, Cl. 430-233.000.
Chapman, Derek D.; and DeBoer, Charles D., 5,036,040, Cl. 503-227.000.
Chen, Tsang J.; Nielsen, Paul L.; and Pavlisko, Joseph A., 5,035,927, Cl. 427-444.000.
DeBoer, Charles D.; and Evans, Steven, 5,035,977, Cl. 430-200.000.
Hediger, Edwin A., 5,036,339, Cl. 346-107.00R.
Hills, Robert G., 5,036,430, Cl. 361-399.000.
Kavaliunas, Arunas V., 5,035,809, Cl. 210-728.000.
Lee, J. Kelly; Kriegel, Jon; and Stephany, Thomas, 5,035,415, Cl. 271-265.000.
Paxon, James F.; and Schommer, Duane J., 5,036,360, Cl. 355-208.000.
Stelter, Eric C., 5,036,362, Cl. 355-245.000.
Tveit, Gary L.; and Nageldinger, Edward L., 5,035,457, Cl. 294-86.004.
Walls, John E., 5,035,982, Cl. 430-331.000.

Eastmond, Bruce C., to Motorola, Inc. Speech operated noise attenuation device. 5,036,540, Cl. 381-47.000.

Eastport International: *See—*
Hill, Robert M.; and Barksdale, Gordon, 5,035,540, Cl. 405-157.000.

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Walton, Erlen B.; Preston, David M.; Oliver, James L.; and Juriga, James A., 5,035,408, Cl. 267-265.000.

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Eckert, Rudolf J. A.: *See—*
Rhodes, Robert B.; and Eckert, Rudolf J. A., 5,035,820, Cl. 252-50.000.

Eckhardt, Claude; Hefti, Heinz; Meyer, Hans R.; and Weber, Kurt, to Ciba-Geigy Corporation. Stable bleaching detergents containing stilbene fluorescent whitening agents. 5,035,825, Cl. 252-95.000.

Edelman, Paul F., to KCL Corporation. Reclosable shipping sack. 5,035,517, Cl. 383-61.000.

Edwards, David B., to Racal Safety Limited. Powered respirators. 5,035,239, Cl. 128-205.230.

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Brownhill, Richard; and Husted, Martin D., 5,036,428, Cl. 361-386.000.

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Kanto, Jumpei J. K.; Saito, Hitoshi H. S.; Eguchi, Hiroshi H. E.; and Nakamura, Masayuki M. N., 5,036,041, Cl. 503-227.000.

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Dorsch, Dieter; Eidenschink, Rudolf; Rieger, Bernhard; and Marowsky, Gerd, 5,035,839, Cl. 252-587.000.

Eisai Co., Ltd.: *See—*
Saeki, Yasuharu; Koyama, Noritoshi; Watanabe, Sumio; and Aoki, Shigeru, 5,035,899, Cl. 424-480.000.
Shibusawa, Koichi; and Ohsawa, Shigemitsu, 5,035,895, Cl. 424-450.000.

Eisenberg, Martin A. Method and device for extension ladder safety. 5,035,299, Cl. 182-212.000.

Elbe, Hans-Ludwig; Brandes, Wilhelm; Dutzmann, Stefan; and Hanssler, Gerd, to Bayer Aktiengesellschaft. Fungicidal 4-(4-substituted-phenyl)-3,3-dimethyl-2-(3-pyridyl)-butan-2-ol derivatives. 5,036,073, Cl. 514-277.000.

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Germani, Emilio, 5,036,246, Cl. 313-440.000.

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London, Sol, 5,036,237, Cl. 310-172.000.

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Atherton, Linda, 5,035,721, Cl. 44-594.000.

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Lamper, David; and Grettenberg, Thomas L., 5,036,324, Cl. 342-132.000.

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Shin, Dong K., 5,036,529, Cl. 375-119.000.

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Beran, Jaroslav; Pavlu, Milos; Prasil, Vladimir; Holy, Zdenek; Pesek, Frantisek; Vitamvas, Zdenek; and Vitak, Josef, 5,035,369, Cl. 242-18.0DD.

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Wally, Joseph H., Jr.; Elkins, Arlen C.; Halsey, Ron L.; and Pace, Herbert W., 5,036,355, Cl. 355-75.000.

Ellenberger, Jane A. Cutting blade mounted apparatus for controlled precision cut of sheet material. 5,035,054, Cl. 30-233.000.

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Ellis, Gordon W.; and Ichie, Koji, to Hamamatsu Photonics K.K. Confocal laser scanning transmission microscope. 5,035,476, Cl. 350-6.500.

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Kalnitsky, Alexander; Ellul, Joseph P.; and Boothroyd, Albert R., 5,035,916, Cl. 427-38.000.

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Alznauer, Kurt, 5,035,569, Cl. 414-757.000.

El-Sayed, Lyla M.; and Page, Loretta Ann G., to Du Pont de Nemours, E. I., and Company. AB diblock copolymers as charge directors for negative electrostatic liquid developer. 5,035,972, Cl. 430-114.000.

Elscint Ltd.: *See—*
Stokar, Saul, 5,035,244, Cl. 128-653.00A.

ElSohly, Mahmoud A.; and Little, Thomas L., Jr. Deuterated cannabinoids as standards for the analysis of tetrahydrocannabinol and its metabolites in biological fluids. 5,036,014, Cl. 436-8.000.

Elton, Richard K.; and Schultz, William R., Jr., to General Electric Co. Semi-conducting layer for insulated electrical conductors. 5,036,165, Cl. 174-102.0SC.

Ema, Hidetoshi; and Takahashi, Hiroshi, to Ricoh Company, Ltd. Semiconductor laser controller. 5,036,519, Cl. 372-38.000.

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Butler, Colin, 5,035,082, Cl. 49-334.000.

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Pytryga, Frank G.; and Prince, Martin, 5,035,269, Cl. 141-1.000.

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Honkomp, Glenn A.; Tingley, Eugene H.; McNay, Thomas O.; and Bowsky, Benjamin, 5,035,653, Cl. 439-622.000.
Newberg, Barry M., 5,035,043, Cl. 29-596.000.
Steiner, Robert E.; and Soultanian, Daniel S., 5,035,024, Cl. 15-339.000.

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Smart, Charles F.; and D'Aquila, Anthony, 5,035,353, Cl. 227-2.000.

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Hasegawa, Takao; and Endo, Hideo, 5,035,967, Cl. 429-147.000.

Endo, Hiroshi, to Japan Aviation Electronics Industry Limited. Electrical connector with socket contacts of different sizes having means for preventing erroneous connection. 5,035,654, Cl. 439-679.000.

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Palmer, John L.; and Timmerman, Marsha W., 5,036,000, Cl. 435-26.000.

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Sergei A.; Esikman, Vladimir L.; Vasiliev, Andrei V.; and Kolgin, ALexandr P., 5,036,170, Cl. 219-10.410.
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Grosjean, Laurent, 5,036,502, Cl. 368-286.000.
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Wilson, Geoffrey; and Evans, Gareth A., 5,036,173, Cl. 219-69.110.
Evans, Steven: *See*—
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Putnam, Peter H.; and Durcan, Michael P., 5,035,088, Cl. 51-165.710.
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Atwood, Harvey E., 5,035,794, Cl. 208-262.100.
Chung, David Y.; and Johnston, John E., 5,035,821, Cl. 252-51.50A.
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Iglesia, Enrique; Vroman, Hilda; Soled, Stuart; Baumgartner, Joseph; and Fiato, Rocco A., 5,036,032, Cl. 502-260.000.
Peiffer, Dennis G., 5,036,136, Cl. 524-812.000.
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Neufeld, Arthur H.; Joyce, Nancy C.; and Jumblatt, Marcia M., 5,036,046, Cl. 514-12.000.
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Faes, Franciscus C. M.; Van Gastel, Josephus M. M.; Van De Ven, Johannes T. A.; and Verberne, Petrus A. C., to U.S. Philips Corporation. Rod magazine for electrical or electronic components. 5,035,322, Cl. 206-328.000.
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Fang, Roger C., to Tatung Company of America, Inc. Air cleaner assembly. 5,035,728, Cl. 55-106.000.
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Cocks, Franklin H.; and Farner, Peter W., 5,036,243, Cl. 313-39.000.
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Byer, Robert L.; Fejer, Martin M.; and Lim, Eric J., 5,036,220, Cl. 307-427.000.
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Dockrill, Mark B.; Buckham, John; and Shen, Anthony P., 5,035,936, Cl. 428-96.000.
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Dimanshteyn, Felix A., 5,035,951, Cl. 428-446.000.
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Fishman, Oleg, to Inductotherm Corp. Method and apparatus for supplying and controlling power to a resistance furnace. 5,036,181, Cl. 219-497.000.
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Newell, Robert E.; Rand, Paul K.; and Fitzsimmons, Robert A., 5,035,237, Cl. 128-203.150.
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Rockwood, Robert E.; Duffee, Henry S.; and Downing, James M., 5,035,436, Cl. 277-25.000.
Floyd, Robert A.; and Carney, John M., to Oklahoma Medical Research Foundation; and University of Kentucky Research Foundation. Phenylbutyl nitrone compositions and methods for prevention of gastric ulceration. 5,036,097, Cl. 514-400.000.
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Davey, Kenneth J., 5,035,260, Cl. 137-505.180.
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Brickell, Joseph W.; and Post, Steven W., 5,035,357, Cl. 239-156.000.
Le Devehat, Eugene, 5,035,021, Cl. 15-104.061.
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Poss, Kathleen M., 5,035,740, Cl. 71-93.000.
Sikorski, Charles F.; and DeMarco, John W., 5,035,871, Cl. 423-305.000.
Fockens, Tallienco W. H., to N.V. Nederlandsche Apparatenfabriek Nedap. Identification system. 5,036,308, Cl. 340-572.000.
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Unterlander, Rick; and Fok, Tai C., 5,035,603, Cl. 425-522.000.
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Green, Nancy M.; and Foley, Mark P., 5,035,679, Cl. 474-135.000.
Fong, Dodd W.; and Hoots, John E., to Nalco Chemical Company. Scaling salt threshold inhibition and dispersion with hydrophilic/hydrophobic polymers. 5,035,806, Cl. 210-701.000.
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Land, John T.; Hopkins, Ronald J.; and Ford, Daniel E., 5,035,852, Cl. 376-353.000.
Ford Motor Company: *See*—
Johnson, Carl F., 5,035,602, Cl. 425-468.000.
Kruzich, J. K., 5,035,083, Cl. 49-352.000.
Roble, Chester W., 5,035,156, Cl. 74-850.000.
Forish, John A.; and Rogers, John J., to Zanxx, Inc. Axial low profile lamp socket assembly. 5,035,643, Cl. 439-358.000.
Forster, Alfred; and Schorner, Gerd, to Siemens Aktiengesellschaft. Method for the interference suppression in ultrasonic distance measurements. 5,036,477, Cl. 364-567.000.
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Forsythe, Kenneth D. Method for functional evaluation and exercising the back muscles of a person. 5,035,234, Cl. 128-25.00R.
Fossion, Jacques J.: *See*—
Deboeck, Arthur M.; Baudier, Philippe R.; Fossion, Jacques J.; and Maes, Paul J., 5,036,100, Cl. 514-420.000.
Foutsitzis, Arthur A.; Padrta, Frank G.; and Russ, Michael B., to UOP. Cleanup of hydrocarbon-conversion system. 5,035,792, Cl. 208-138.000.
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Fox Valley Systems, Inc.: *See*—
Smrt, Thomas J.; and Khan, Abdul F., 5,035,920, Cl. 427-202.000.
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Mohn, Frank, 5,035,842, Cl. 261-76.000.

Frank, Jack D., to Hughes Aircraft Company. Combined laser position detector, infrared emissivity target and TV target. 5,036,206, Cl. 250-467.100.

Franklin, David; Franklin, Joseph; and Hughes, Paul. Method and apparatus for sound responsive tactile stimulation of deaf individuals. 5,035,242, Cl. 128-420.500.

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Frantz, Thomas M.: *See*—
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Fraser, Howard H., Jr.; Boonzha, William J.; and Etemad, Shahrokh, to Carrier Corporation. Method and apparatus for reducing scroll compressor tip leakage. 5,035,589, Cl. 418-1.000.

Frazza, Mark S.; and Smith, Linda S., to Rohm and Haas Company. Method for treating substrates. 5,035,944, Cl. 428-312.400.

Freeburg, Thomas A., to Motorola, Inc. Bit error rate detection. 5,036,515, Cl. 371-5.500.

Freed, William T.: *See*—
Ilenda, Casmir S.; Frantz, Thomas M.; and Freed, William T., 5,035,933, Cl. 428-36.600.

Freeman, Clarence S.; and Freeman, Katherine M. Water detection and removal for instruments. 5,035,805, Cl. 210-689.000.

Freeman, Katherine M.: *See*—
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Frick, Beat; and Kraft, Walter, to Gretag Systems. Exposure control process and photographic color copying apparatus. 5,036,351, Cl. 355-38.000.

Fried, Jeffrey A.: *See*—
Gechter, Jerry; Fried, Jeffrey A.; and Pokress, Robert L., 5,036,535, Cl. 379-210.000.

Friedenthal, Kenneth J.; de La Chapelle, Michael; and Hsu, Hui-Pin, to Hughes Aircraft Company. Fiber optic radar guided missile system. 5,035,375, Cl. 244-3.120.

Friedl, Stephan E.: *See*—
Abela, George S.; and Friedl, Stephan E., 5,036,463, Cl. 364-413.130.

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Frigg, Robert, to Synthes (U.S.A.). Orthopedic medullary nail. 5,035,697, Cl. 606-67.000.

Friis, Elizabeth A., to Orthopaedic Research Institute, Inc. Surgical implants incorporating re-entrant material. 5,035,713, Cl. 623-16.000.

Frohlich, Alfons; and Probst, Anton, to Opti-Patent-, Forschungs-und Fabrikations-AG. Slide-fastener stringer half with knitted-in coupling coil. 5,035,125, Cl. 66-193.000.

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Nakazato, Wataru; Muraoka, Kunihiko; Inaba, Shigemitsu; Ohtaka, Kazuto; and Takagishi, Takashi, 5,035,644, Cl. 439-372.000.
Ohkumo, Hiroya; and Miyama, Shuji, 5,035,219, Cl. 123-425.000.
Sakamoto, Masanori; and Kubota, Masaharu, 5,035,216, Cl. 123-339.000.
Watanabe, Hideo, 5,035,223, Cl. 123-459.000.

Fuji Photo Film Co., Ltd.: *See*—
Adachi, Keiichi; Ohno, Shigeru; and Waki, Kokichi, 5,035,985, Cl. 430-432.000.
Hayashi, Kazunori, deceased; Hayashi, Masahiro, legal representative; and Hayashi, Masako, legal representative, 5,035,984, Cl. 430-378.000.
Hirano, Shigeo; Murai, Ashita; and Suzuki, Seiji, 5,035,993, Cl. 430-598.000.
Horie, Seiji; and Makino, Naonori, 5,035,968, Cl. 430-58.000.
Ichikawa, Yasunori; Ohnishi, Hiroshi; Urabe, Shigeharu; Kojima, Akira; and Katoh, Akira, 5,035,991, Cl. 430-569.000.
Kato, Eiichi; and Ishii, Kazuo, 5,035,971, Cl. 430-114.000.
Kondo, Syunichi; Yokoya, Hiroaki; and Horie, Seiji, 5,035,969, Cl. 430-83.000.
Nakamura, Takashi; and Kojima, Yasushi, 5,036,207, Cl. 250-484.100.
Nakamura, Yoshisada; Morigaki, Masakazu; Ishii, Yoshio; and Sakanoue, Kei, 5,035,988, Cl. 430-551.000.
Nishiyama, Shingo; and Saeki, Naomi, 5,035,989, Cl. 430-567.000.
Saeki, Keiso; and Endo, Toshiaki, 5,035,974, Cl. 430-138.000.
Saito, Shinji; and Ogawa, Hiroshi, 5,035,948, Cl. 428-329.000.
Sakai, Nobuo; and Ohno, Shigeru, 5,035,986, Cl. 430-522.000.
Sakamoto, Kiichiro, 5,036,353, Cl. 355-72.000.
Shiota, Kazuo, 5,036,402, Cl. 358-244.000.
Takahashi, Ryuichi; and Nakamura, Taku, 5,035,975, Cl. 430-138.000.

Fujii, Akira: *See*—
Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Nakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, 5,036,350, Cl. 354-475.000.

Fujii, Takeshi: *See*—
Toyoshima, Yoshiki; Okada, Mitsuyuki; Fujii, Takeshi; Yamaguchi, Kentaro; and Tsuji, Mitsuji, 5,036,141, Cl. 525-286.000.

Fujimori, Shuichi: *See*—
Koiwa, Yoshinobu, 5,035,261, Cl. 137-516.110.

Fujimoto, Isamu: *See*—
Yoshida, Shigeo; and Fujimoto, Isamu, 5,036,187, Cl. 250-214.00B.

Fujimoto, Satoshi: *See*—
Harashima, Noboru; Mimura, Kazuhiro; Sasaki, Yosuke; Okubo, Hideaki; Nogawa, Makoto; and Fujimoto, Satoshi, 5,035,599, Cl. 425-150.000.

Fujino, Hitoshi: *See*—
Takii, Yasuo; and Fujino, Hitoshi, 5,036,440, Cl. 362-95.000.

Fujioka, Shuzo: *See*—
Takahira, Kenichi; Yamaguchi, Atsuo; Furuta, Shigeru; Inoue, Takesi; Matsubara, Toshiyuki; and Fujioka, Shuzo, 5,036,460, Cl. 364-200.000.

Fujisawa, Shoji: *See*—
Shiraki, Manabu; Miyao, Osami; Fujisawa, Shoji; and Kawashima, Shunji, 5,036,319, Cl. 341-115.000.

Fujisawa USA, Inc.: *See*—
Alam, Abu S.; Sayeed, Fakrul A. A.; Koziol, Kenneth J.; and Kapoor, John N., 5,036,060, Cl. 514-110.000.

Fujita, Shigeru; Saito, Hideo; Yamamoto, Katsuyuki; Endo, Satoshi; and Kamahora, Fumio, to Toshiba Machine Co., Ltd. Optimum molding condition setting system for injection molding machines. 5,035,598, Cl. 425-144.000.

Fujita, Yasuyuki: *See*—
Hanai, Toshimichi; Nagashima, Hideyuki; and Fujita, Yasuyuki, 5,035,465, Cl. 297-238.000.

Fujitsu Limited: *See*—
Goto, Hiroshi, 5,036,021, Cl. 437-62.000.
Iida, Masaru; Iwamasa, Akiyoshi; and Tonomoto, Yoshihiro, 5,036,363, Cl. 355-246.000.
Kataoka, Toyotaka; and Sakamoto, Kiichi, 5,036,209, Cl. 250-492.200.

Fukazawa, Hiromitsu: *See*—
Ogawa, Motosuke; Fukazawa, Hiromitsu; and Ogawa, Yasumasa, 5,035,833, Cl. 252-182.240.

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Fukuhara, Kunihiro: *See*—
Watanabe, Koji; Nakayama, Hiromichi; and Fukuhara, Kunihiro, 5,035,560, Cl. 411-508.000.

Fukumoto, Ryoichi; and Hayakawa, Shigeru, to Aisin Seiki Kabushiki Kaisha. Door-locking device. 5,035,453, Cl. 292-336.300.

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Fukumoto, Takaaki: *See*—
Tada, Masuo; Hata, Takeki; Fukumoto, Takaaki; and Ohmori, Toshiaki, 5,035,750, Cl. 134-7.000.

Fukunaga, Kenichi: *See*—
Taguchi, Fumiaki; Mitsui, Isamu; Hara, Kinichi; Hayashi, Masaro; Ezawa, Kunio; Fukunaga, Kenichi; and Kuranari, Jun, 5,035,995, Cl. 435-4.000.

Fukusaki, Hiroaki; Umehara, Masakazu; and Gatayama, Hiroyuki, to Tenchi Kikai Kabushiki Kaisha. Method and apparatus for sorting objects. 5,035,315, Cl. 198-419.200.

Fullemann, Rainer: *See*—
Dietze, Werner; Fullemann, Rainer; and Lutz, Thomas, 5,035,862, Cl. 422-68.100.

Funada, Fumiaki: *See*—
Kozaki, Shyuichi; Okada, Masako; Funada, Fumiaki; Sasaki, Kei; Saito, Hideo; and Takeshita, Fusayuki, 5,035,928, Cl. 428-1.000.

Funakawa, Shigeru: *See*—
Horita, Yoshiyuki; Nakayama, Kiyoshi; Sugimoto, Yasuhiko; Kikukawa, Norio; Yamaguchi, Yoshiharu; and Funakawa, Shigeru, 5,035,029, Cl. 24-394.000.

Funamoto, Takao: *See*—
Yada, Masami; Funamoto, Takao; Kitamura, Michio; Komatsu, Junzo; Midorikawa, Masakazu; and Yoshikawa, Tsugio, 5,035,579, Cl. 416-241.00R.

Furche, Thomas: *See*—
Schmidt, Jurgen; Furche, Thomas; Erdmann, Roland; Reichert, Marion; Bayer, Ullrich; Kurze, Peter; Schwarz, Thomas; Schreckenbach, Joachim; Kletke, Hans-Jurgen; Hoffmann, Andreas; Heppner, Martin; Hasse, Anja; Schmidt, Dorith; and Klaus, Annette, 5,035,781, Cl. 204-129.900.

Furcsik, Susan L.; and Mauro, David J., to American Maize-Products Company. Starch jelly candy. 5,035,912, Cl. 426-578.000.

Furukawa, Noriyuki: *See*—
Tokuda, Shuichirou; Furukawa, Noriyuki; and Kawai, Yoshinori, 5,036,435, Cl. 362-31.000.

Furuta, Shigeru: *See*—
Takahira, Kenichi; Yamaguchi, Atsuo; Furuta, Shigeru; Inoue, Takesi; Matsubara, Toshiyuki; and Fujioka, Shuzo, 5,036,460, Cl. 364-200.000.

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Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, 5,036,270, Cl. 324-96.000.

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Chinn, Leland J.; Desai, Bipinchandra N.; and Mueller, Richard A., 5,036,105, Cl. 514-532.000.

Gabbard, Ronald G.: *See*—
Arora, Vijay K.; Jones, Gary V.; Kovtun, John M.; and Gabbard, Ronald G., 5,035,908, Cl. 426-388.000.

Gabel, Jonathan B.: *See*—
Alchas, Paul G.; Augello, Frank A.; Brooks, Christopher J.; Cutshall, Tony A.; DiPisa, Joseph A., Jr.; Williams, Stuart K.; Gabel, Jonathan B.; Mulhauser, Paul J.; Prais, Wes; Jarrell, Bruce E.; and Rose, Deborah G., 5,035,708, Cl. 623-1.000.

Gaertner, Karin C.: *See*—
Huang, Victor T.; Hoseney, R. Carl; Graf, Ernst; Ghiasi, Katy; Miller, Linda C.; Weber, Jean L.; Gaertner, Karin C.; Matson, Kristin L.; Hunstiger, Antoinette M.; Rogers, Deborah K.; and Saguy, Israel A., 5,035,904, Cl. 426-243.000.

GAF Chemicals Corporation: *See*—
Dougherty, James A.; Plotkin, Jeffrey S.; Vara, Fulvio J.; and Narayanan, Kolazi S., 5,036,112, Cl. 522-31.000.
Suwala, David W., 5,035,829, Cl. 252-170.000.

Gaines, Frederick W., Jr.: *See*—
Iuliano, Joseph; and Gaines, Frederick W., Jr., 5,035,022, Cl. 015-118.000.

Gaiser, John W.: *See*—
Kasprzyk, Daniel J.; Orth, Jean C.; and Gaiser, John W., 5,035,694, Cl. 606-27.000.

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Monopoli, Dion V., 5,036,166, Cl. 174-128.100.

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Ganter, Wolfgang, to Junghans Uhren GmbH. Autonomous radio time piece having a resettable receiver actuation switch. 5,036,500, Cl. 368-47.000.

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Colle, Roberto; Camaggi, Giovanni; Gozzo, Franco; Ratti, Giuseppina; Mirenna, Luigi; and Garavaglia, Carlo, 5,036,094, Cl. 514-383.000.

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Gardos, Michael N.; Lipp, Larry C.; and Griffin, William S., to Hughes Aircraft Company. Solid lubricated resistive ink for potentiometers. 5,035,836, Cl. 252-511.000.

Gargollo, Roberto L. Method and apparatus for constructing an articulated pavement system. 5,035,532, Cl. 404-41.000.

Garnham, David, to Cooper Industries, Inc. Valve with removable insert. 5,035,258, Cl. 137-454.200.

Garrison, Robert L.; and Rothwell, Harold L., to GTE Products Corporation. Arc discharge ballast suitable for automotive applications. 5,036,256, Cl. 315-308.000.

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Andrieu, Jean-Pierre; Gault, Dominique; and Henri, Jean-Claude, 5,036,326, Cl. 342-176.000.

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Jacks, Donald J.; Panlaqui, Clayton E.; Boss, Raymond E.; and Gaunt, Edwin, 5,035,181, Cl. 102-481.000.

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Walter, Hans-Michael; Bronstert, Klaus; Gausepohl, Hermann; and Pohrt, Juergen, 5,036,130, Cl. 524-505.000.

Gay, Benjamin A.: *See*—
Lowndes, William, III; Gay, Francis V., III; and Gay, Benjamin A., 5,035,592, Cl. 425-64.000.

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Tran, Dung Q., 5,036,229, Cl. 307-497.000.

Gechter, Jerry; Fried, Jeffrey A.; and Pokress, Robert L., to UNIFI Communications Corporation. Switchless automatic call distribution system. 5,036,535, Cl. 379-210.000.

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Geller, William L., to Raynet Corporation. Thermal control for laser diode used in outside plant communications terminal. 5,036,189, Cl. 250-205.000.

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Voigt, Allan. A.; York, Kenneth C.; and Speicher, John M., 5,035,376, Cl. 244-3.210.

General Electric Co.: *See*—
Elton, Richard K.; and Schultz, William R., Jr., 5,036,165, Cl. 174-102.0SC.
Jackson, Melvin R.; Prugar, Mark L.; Yang, Swe-Wong; Rairden, John R., III; and Gigliotti, Michael F. X., Jr., 5,035,958, Cl. 428-553.000.
Levinson, Lionel M.; Brown, Dale M.; and Thornton, Roy F., 5,035,964, Cl. 429-120.000.
Osteen, Mitchell M., 5,036,445, Cl. 362-348.000.
Papallo, Thomas F., Jr.; and Castonguay, Roger N., 5,036,303, Cl. 335-17.000.
Rinehart, Michael K.; and Ziegelmeyer, James J., 5,036,126, Cl. 524-141.000.
Tseng, Wu-Yang; and Hauser, Ambrose A., 5,035,573, Cl. 415-173.200.

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Jeffers, John M.; Mundy, S. Wayne; and Knight, Stephen P., 5,036,537, Cl. 380-20.000.
Marz, Daniel, 5,036,291, Cl. 329-325.000.

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Kubisch, John G., 5,035,277, Cl. 164-255.000.

Gentry, Scott B.: *See*—
Blackburn, Brian K.; Mazur, Joseph F.; and Gentry, Scott B., 5,036,467, Cl. 364-424.050.

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Moran, Dan; and Gerlitz, Yonatan, 5,036,311, Cl. 340-600.000.

Germani, Emilio, to Eldor S.p.A. Compensated deflection yoke for cathode-ray tubes. 5,036,246, Cl. 313-440.000.

Gerosa, Gianfranco: *See*—
Rollins, Norman T.; and Gerosa, Gianfranco, 5,036,217, Cl. 307-272.200.

Gerretz, Josef, to Mannesmann AG. Apparatus for rotating and advancing stock in pilgrim step cold rolling mills. 5,035,132, Cl. 72-214.000.

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Apfel, Marilyn A.; Ghebre-Sellassie, Isaac; and Nesbitt, Russell U., 5,035,896, Cl. 424-456.000.

Ghiasi, Katy: *See*—
Huang, Victor T.; Hoseney, R. Carl; Graf, Ernst; Ghiasi, Katy; Miller, Linda C.; Weber, Jean L.; Gaertner, Karin C.; Matson, Kristin L.; Hunstiger, Antoinette M.; Rogers, Deborah K.; and Saguy, Israel A., 5,035,904, Cl. 426-243.000.

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Brucculeri, Louis S.; and Giddings, James N., 5,036,221, Cl. 307-443.000.

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Jackson, Melvin R.; Prugar, Mark L.; Yang, Swe-Wong; Rairden, John R., III; and Gigliotti, Michael F. X., Jr., 5,035,958, Cl. 428-553.000.

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Thomas, David A.; O'Connell, Robert M.; Reinert, Robert C.; and Gillin, John M., 5,035,935, Cl. 428-43.000.

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Battilotti, Massimo; and Giongo, Matteo, 5,035,791, Cl. 204-415.000.

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Girguis, Sobhy L. Overload clutch. 5,035,31:, Cl. 192-56.00R.

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Woelfel, Julian B., 5,035,616, Cl. 433-72.000.

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Geilen, Herman J.; and Glasmacher, Klaus, 5,035,469, Cl. 303-87.000.

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Coates, Ian H., 5,036,078, Cl. 514-323.000.

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Glidden Company, The: *See*—
Kunz, Barbara L.; and Craun, Gary P., 5,036,134, Cl. 524-560.000.
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Bowen, Gerald K.; Eskra, Michael D.; and Belongia, David C., 5,035,045, Cl. 29-623.200.
Glycomed, Incorporated: *See*—
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Goethals, Eric; Halkes, Sebastianus J.; and Koolstra, Robert B., to Duphar International Research B.V. Method for the photochemical conversion of tachysterol compounds into previtamin D compounds and of trans-vitamin D compounds into cis-vitamin D compounds. 5,035,783, Cl. 204-157.670.
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Kim, Eung S.; Kim, Byung J.; and Ahn, Seong J., 5,036,171, Cl. 219-10.55D.
Goldstein, Gideon: *See*—
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Clark, David A.; Goldstein, Steven W.; and Hulin, Bernard, 5,036,079, Cl. 514-333.000.
Goldstein, Vladimir, to Sunwell Engineering Company Ltd. Ice storage and distribution unit. 5,035,733, Cl. 62-541.000.
Goodman, William L., to Gas Research Institute. Magnetically detectable plastic pipe. 5,036,210, Cl. 235-493.000.
Goodyear Tire & Rubber Company, The: *See*—
Boon, Wyndham H.; Gartland, Robert J.; and Pesata, Patrick J., Jr., 5,036,113, Cl. 522-96.000.
Gork, Fritz-Peter; Muller, Klaus-Dieter; and Schweitzer, Doris, to Lufthansa Service GmbH. Method for supplying foodstuff samples for microbiological testing. 5,036,001, Cl. 435-31.000.
Gorski, Richard M.: *See*—
Chen, Hsing-Yao; and Gorski, Richard M., 5,036,258, Cl. 315-382.000.
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Heuvelmans, Joannes H. A.; and Goslinga, Hieltje, 5,035,246, Cl. 128-673.000.
Goto, Hiroshi, to Fujitsu Limited. Method of producing a semiconductor device with total dielectric isolation. 5,036,021, Cl. 437-62.000.
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Shimizu, Norihiko; Sato, Kanji; Saiki, Toru; Goto, Kunio; Matsubara, Masuo; and Wada, Hiroshi, 5,035,410, Cl. 269-136.000.
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Arai, Takayuki; Goto, Takaharu; and Hamai, Kyugo, 5,035,210, Cl. 123-193.00P.
Gotschi, Erwin, to Hoffmann-La Roche Inc. Cephalosporins with sulfur-containing oxyimino side chain. 5,036,064, Cl. 514-206.000.
Gottesman, Stephen R.; and Schneid, Edward J., to Grumman Aerospace Corporation. Pseudo-noise product coded aperture arrays and method for designing same. 5,036,546, Cl. 382-65.000.
Gottling, Helmut; Moller, Rudolf; Muller, Peter; and Scharnowski, Gerhard, to WABCO Westinghouse Steuerungstechnik GmbH & Co. Working cylinder and tension member therefor. 5,035,171, Cl. 92-137.000.
Gottschalk, Peter; Neckers, Douglas C.; Schuster, Gary B.; Adair, Paul C.; and Pappas, S. Peter, to Mead Corporation. Method of dental treatment. 5,035,621, Cl. 433-226.000.
Gounot, Marie-Therese: *See*—
Trouiller, Jean-Claude; and Gounot, Marie-Therese, 5,036,283, Cl. 324-375.000.
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Graf, Ernst: *See*—
Huang, Victor T.; Hoseney, R. Carl; Graf, Ernst; Ghiasi, Katy; Miller, Linda C.; Weber, Jean L.; Gaertner, Karin C.; Matson, Kristin L.; Hunstiger, Antoinette M.; Rogers, Deborah K.; and Saguy, Israel A., 5,035,904, Cl. 426-243.000.
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Piana, Ivana; and Piana, Silvano, 5,035,048, Cl. 29-809.000.
Grandone, Cass J., to Abbott Laboratories. Locking rack and disposable sample cartridge. 5,035,861, Cl. 422-64.000.
Granger, Claude; and Troadec, Bernard, to Atochem. Recovery device and procedure for extracting a sheath after it has been folded transversely. 5,035,685, Cl. 493-416.000.
Granger, Ray L. Mailbox cover structure. 5,035,356, Cl. 232-17.000.
Grantham, Rodger P.: *See*—
Carmack, Paul D.; and Grantham, Rodger P., 5,035,271, Cl. 141-206.000.
Grau, Gerhard; and Wieland, Rudolf, to Zinser Textilmaschinen GmbH; and Spindelfabrik Susen, Schurr, Stahlecker & Grill. Means for manipulating a drafting roller carrier of a textile machine. 5,035,027, Cl. 19-258.000.
Gray, Cecil D., Jr. Boot logo holder. 5,035,070, Cl. 36-136.000.
Gray, Colin J.: *See*—
Barnett, Anthony M.; Gray, Colin J.; and Baker, Julie, 5,035,978, Cl. 430-233.000.
Great Lakes Chemical Corporation: *See*—
Atwell, Ray W.; Favstritsky, Nicolai A.; Stallings, John P.; and Termine, Enrico J., 5,036,129, Cl. 524-278.000.
Great Lakes Orthodontics, Ltd.: *See*—
Breads, Peter R.; Abbatte, Gerard P.; and Warunek, Stephen P., 5,035,613, Cl. 433-6.000.
Grecksch, Hans; and Engelhardt, Dietmar, to W. Schlafhorst & Co. Apparatus for stabilizing a yarn package tube during yarn unwinding. 5,035,371, Cl. 242-35.50R.
Green, Christopher J.; and Wallace, James S., to University of Toronto Innovations Foundation, The. Electrically actuated gaseous fuel timing and metering device. 5,035,360, Cl. 239-585.000.
Green, Nancy M.; and Foley, Mark P., to Dayco Products, Inc. Belt tensioner and method of making the same. 5,035,679, Cl. 474-135.000.
Greenblatt, Richard D., to Academy of Applied Science. Method of and apparatus for integrated voice (audio) communication simultaneously with "under voice" user-transparent digital data between telephone instruments. 5,036,513, Cl. 370-125.000.
Greenfield, Raphael L., to TP Orthodontics, Inc. Intruding and torquing auxiliary. 5,035,614, Cl. 433-21.000.
Gregor Jonsson Associates, Inc.: *See*—
Betts, Edmund D., 5,035,669, Cl. 452-5.000.
Pershinske, James E., 5,035,670, Cl. 452-5.000.
Gress, Jean-Claude, to Gress S.A. Device for regulating the flow in a drainage siphon tube. 5,035,535, Cl. 405-50.000.
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Gress, Jean-Claude, 5,035,535, Cl. 405-50.000.
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Frick, Beat; and Kraft, Walter, 5,036,351, Cl. 355-38.000.
Grettenberg, Thomas L.: *See*—
Lamper, David; and Grettenberg, Thomas L., 5,036,324, Cl. 342-132.000.
Griffin, William S.: *See*—
Gardos, Michael N.; Lipp, Larry C.; and Griffin, William S., 5,035,836, Cl. 252-511.000.
Grilliot, Mary I.: *See*—
Grilliot, William L.; and Grilliot, Mary I., 5,035,007, Cl. 2-227.000.
Grilliot, William L.; and Grilliot, Mary I. Firefighter's trousers capable of receiving a booted foot. 5,035,007, Cl. 2-227.000.
Grimes, Charles I. Implement for seeding grass. 5,035,190, Cl. 111-195.000.
Grinsteiner, James J.: *See*—
Mathews, Will W.; Serio, John A.; and Grinsteiner, James J., 5,035,637, Cl. 439-271.000.
Groeseneken, Guido V. L.; and Maes, Herman E. M., to Interuniversitair Micro-Elektronica Centrum. System of measuring a state density in a semi-conductor element and a method using this system. 5,036,273, Cl. 324-158.00T.
Grondin, David H.; and Schade, Irene M., to United Technologies Corporation. Filter pump system. 5,035,811, Cl. 210-806.000.
Grosjean, Laurent, to ETA SA Fabriques d'Ebauches. Capped watch case. 5,036,502, Cl. 368-286.000.
Gross, Clifford; and Cooper, Patricia, to Biomechanics Corporation of America. Video terminal accessory. 5,035,392, Cl. 248-422.200.
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Coudurier, Pierre; Boutte, Pierre; Romeuf, Patrick; Tronchon, Paul; and Auffranc, Michel, 5,035,623, Cl. 434-286.000.
Groves, George D., to B & G Consultants, Inc. Vegetation barrier incorporating temperature compensation. 5,035,079, Cl. 47-33.000.
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Grumman Aerospace Corporation: *See*—
Ackerman, William H., Jr.; and Sainola, John P., 5,036,465, Cl. 364-423.000.
Fitzgerald, Frank; and Ackerman, William H., Jr., 5,036,466, Cl. 364-423.000.
Gottesman, Stephen R.; and Schneid, Edward J., 5,036,546, Cl. 382-65.000.
Schulte, Robert L., 5,036,202, Cl. 250-370.050.
Solomon, Allen L., 5,036,203, Cl. 250-370.060.
GSW Inc.: *See*—
Brant, Anthony W., 5,035,092, Cl. 52-11.000.
GTE Laboratories Incorporated: *See*—
Sarin, Vinod K., 5,035,923, Cl. 427-255.000.
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Garrison, Robert L.; and Rothwell, Harold L., 5,036,256, Cl. 315-308.000.
Parent, Edward D.; and Smith, Oliver S., 5,035,201, Cl. 118-726.000.
Shaffer, John W., 5,036,244, Cl. 313-116.000.
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Pawlik, James A., 5,035,546, Cl. 407-116.000.
Gu, Ben; Bliznik, Kenneth E.; Singer, Helmut K.; and Ward, Sharon M., to Schering Corporation. Contact lens disinfecting system. 5,035,859, Cl. 422-28.000.
Guder, Hans-Joachim: *See*—
von der Eltz, Herbert; Guder, Hans-Joachim; and Muhlegger, Klaus, 5,035,998, Cl. 435-18.000.
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Clement, Jose ; and Guerard, Daniel, 5,036,205, Cl. 250-442.100.

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Comte, Marie-Therese; Gueremy, Claude; Malleron, Jean-Luc; Mignani, Serge; Peyronel, Jean-Francois; and Truchon, Alain, 5,036,075, Cl. 514-293.000.
Guerra, Robert: *See*—
Goldberg, Paul R.; Clark, Bryan K.; Finegan, Joel D.; and Guerra, Robert, 5,036,511, Cl. 369-284.000.
Gulati, Kailash C.; and Prodanovic, Anton, to Mobil Oil Corporation. Rubble-spray ice island. 5,035,541, Cl. 405-217.000.
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Hansen, Bertil V.; Gunnarsson, Per-Olov G.; Mollberg, Henri R.; and Johansson, Sven-Åke, 5,036,062, Cl. 514-176.000.
Gupta, Pramod K.; and Pullman, Gerald S., to Weyerhaeuser Company. Method for reproducing coniferous plants by somatic embryogenesis using abscisic acid and osmotic potential variation. 5,036,007, Cl. 435-240.450.
Gural, Kenneth. Intelligent telephone interface for automatic answering systems, and method of using. 5,036,534, Cl. 379-67.000.
Gurley, James, to Spectragraphics, Inc. Simultaneous display of interleaved windowed video information from multiple asynchronous computers on a single video monitor. 5,036,315, Cl. 340-721.000.
Gusdorf Corporation: *See*—
Massoudnia, Mohammad E., 5,035,335, Cl. 211-188.000.
Guzewska, Maria E.: *See*—
Rzeszotarski, Waclaw J.; Guzewska, Maria E.; McPherson, Daniel W.; Spagnuolo, Ciro J.; and Natalie, Kenneth J., Jr., 5,036,107, Cl. 514-648.000.
H. B. Fuller Licensing & Financing Inc.: *See*—
Zimmel, John M.; Katsaros, Mark G.; and Bunnelle, William L., 5,035,691, Cl. 604-361.000.
Haak, Wayne R., to J. Paul Getty Trust, The. Isolator for seismic activity. 5,035,394, Cl. 298-562.000.
Haas, Rainer, to Hans Hollmuller Maschinenbau GmbH & Co. Installation for etching objects. 5,035,765, Cl. 156-345.000.
Haase, Franklin D., to CCL Industries. Method of sealing a valve to an aerosol container. 5,035,106, Cl. 53-470.000.
Habeeb, Jacob J.; Singhal, Gopal H.; Billimoria, Rustom M.; and Stover, William H., to Exxon Research and Engineering Company. Lubricating oil containing a nickel alkoxyalkylxanthate and zinc dialkyldithiophosphate. 5,035,815, Cl. 252-32.70E.
Hackworth, Donald T.: *See*—
Dederer, Jeffery T.; and Hackworth, Donald T., 5,036,305, Cl. 335-216.000.
Hageman, Martin D., to Trilach Development Inc. Energy-storing bicycle sprocket drive system. 5,035,678, Cl. 474-50.000.
Hageman, Paul, to Wool Development International Limited. Applicator for crease setting composition. 5,035,199, Cl. 118-681.000.
Hagen, Helmut; Pfister, Juergen; Eichenauer, Ulrich; Wuerzer, Bruno; Helbig, Wilfried; and Westphalen, Karl-Otto, to BASF Aktiengesellschaft. Herbicides which contain 2-(4-aryloxy)phenoxyacetic or -propionic acid derivatives and/or cyclohexenone derivatives as herbicidal active ingredients and naphthalene derivatives as antidotes. 5,035,736, Cl. 71-98.000.
Hagino, Tadao: *See*—
Kubokawa, Hiroaki; Tsukaya, Takashi; Ueda, Yasuhiro; Ohshima, Yutaka; Nakamura, Takeaki; Hibino, Hiroki; Takayama, Shuichi; and Hagino, Tadao, 5,035,231, Cl. 128-6.000.
Hales, Jeffrey E., to U.S. Philips Corporation. Radio receiver filter with image rejection. 5,036,302, Cl. 333-202.000.
Haley, Thomas F. Swivel device for preventing twisting of strings subjected to torsional force. 5,035,667, Cl. 446-247.000.
Halim, Raouf; and Shamlou, Daryush, to Hayes Microcomputer Products, Inc. Iterative automatic gain control for an analog front end of a modem. 5,036,527, Cl. 375-98.000.
Halkes, Sebastianus J.: *See*—
Goethals, Eric; Halkes, Sebastianus J.; and Koolstra, Robert B., 5,035,783, Cl. 204-157.670.
Hallmark Cards, Inc.: *See*—
Buckley, Stephen P.; Robinson, Richard A.; Hurlburt, John H.; Pfahl, Kurt A.; and Doerflinger, Arthur E., 5,036,472, Cl. 364-479.000.
Halpern, Yuval, to Chemical Waste Management, Inc. Process for cleaning trace metals from EDTA. 5,035,840, Cl. 252-632.000.
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Halsey, Ron L.: *See*—
Wally, Joseph H., Jr.; Elkins, Arlen C.; Halsey, Ron L.; and Pace, Herbert W., 5,036,355, Cl. 355-75.000.
Hamaguchi, Susumu: *See*—
Kawabata, Yasukazu; Hamaguchi, Susumu; Takahashi, Toshio; Yokota, Hiroshi; and Shibayama, Katsutoshi, 5,035,318, Cl. 198-779.000.
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Arai, Takayuki; Goto, Takaharu; and Hamai, Kyugo, 5,035,210, Cl. 123-193.00P.
Hamamatsu Photonics K.K.: *See*—
Ellis, Gordon W.; and Ichie, Koji, 5,035,476, Cl. 350-6.500.
Hamel, Pierre: *See*—
Girard, Yves; Hamel, Pierre; and Delorme, Daniel, 5,036,067, Cl. 514-224.800.
Hanai, Toshimichi; Nagashima, Hideyuki; and Fujita, Yasuyuki, to Nissan Motor Co., Ltd.; and Tachi-S Co., Ltd. Vehicular infant safety seat with seat back safety stopper. 5,035,465, Cl. 297-238.000.
Handi-Pac, Inc.: *See*—
Taylor, Beverly W., 5,036,447, Cl. 362-431.000.
Haneda, Satoshi; Shoji, Hisashi; and Yoshino, Kunihisa, to Konica Corporation. Color image forming apparatus. 5,036,367, Cl. 355-260.000.
Hanon, David O.; and Walker, Ricky R., to Plantronics, Inc. Electret microphone transmitter for use in telephone circuits. 5,036,536, Cl. 379-387.000.
Hans Hollmuller Maschinenbau GmbH & Co: *See*—
Haas, Rainer, 5,035,765, Cl. 156-345.000.
Hans-Joachim, Vogt: *See*—
Friedrich, Hornung; and Hans-Joachim, Vogt, 5,036,234, Cl. 307-632.000.
Hansen, Bertil V.; Gunnarsson, Per-Olov G.; Mollberg, Henri R.; and Johansson, Sven-Åke, to Pharmacia AB. Novel esters. 5,036,062, Cl. 514-176.000.
Hansen, Charles L., to United States of America, Army. Integrated multispectral man portable weapon sight. 5,035,472, Cl. 350-1.100.
Hansen, Erland: *See*—
Nielsen, Erik; and Hansen, Erland, 5,035,575, Cl. 416-9.000.
Hansen, Herbert N. W. Vaporizer for internal combustion steam engine. 5,035,227, Cl. 123-557.000.
Hansen, Karl A.: *See*—
Daniels, James W.; and Hansen, Karl A., 5,035,140, Cl. 73-290.00V.
Hanssler, Gerd: *See*—
Elbe, Hans-Ludwig; Brandes, Wilhelm; Dutzmann, Stefan; and Hanssler, Gerd, 5,036,073, Cl. 514-277.000.
Heinemann, Ulrich; Kleefeld, Gerd; Dutzmann, Stefan; and Hanssler, Gerd, 5,036,085, Cl. 514-361.000.
Hanyu, Susumu, to Janome Sewing Machine Co. Ltd. Continuous hem stitching sewing machine. 5,035,193, Cl. 112-266.100.
Hara, Kinichi: *See*—
Taguchi, Fumiaki; Mitsui, Isamu; Hara, Kinichi; Hayashi, Masaro; Ezawa, Kunio; Fukunaga, Kenichi; and Kuranari, Jun, 5,035,995, Cl. 435-4.000.
Hara, Tadataka. Therapeutically useful mineral composition. 5,035,888, Cl. 424-195.100.
Hara, Yasuo, to Hoshizaki Denki Kabushiki Kaisha. Automatic ice making machine. 5,035,118, Cl. 62-126.000.
Harabayashi, Masao, to Tokyo Sintered Metals Corp. Cycle type athletic equipment. 5,035,418, Cl. 272-73.000.
Harashima, Noboru; Mimura, Kazuhiro; Sasaki, Yosuke; Okubo, Hideaki; Nogawa, Makoto; and Fujimoto, Satoshi, to Kabushiki Kaisha Komatsu Seisakusho. Combined injection-molding and pressing machine. 5,035,599, Cl. 425-150.000.
Harigane, Kotaro; Takahashi, Kenichi; and Honda, Hiroaki, to TDK Corporation. Electronic component mounting apparatus. 5,035,047, Cl. 29-740.000.
Harms, Paul; and Sehr, Willibald, to MOBA-Electronic Gesellschaft fur Mobil-Automation mbh. Height sensing device including an ultrasonic sensor and a mechanical sensor. 5,035,290, Cl. 172-1.000.
Harrick, Nicolas J.: *See*—
Milosevic, Milan; and Harrick, Nicolas J., 5,035,504, Cl. 356-300.000.
Harris Corporation: *See*—
Dingwall, Andrew G. F.; Zazzu, Victor; and Erhardt, Harry G., 5,036,219, Cl. 307-353.000.
Harris, Daniel C.: *See*—
Higa, Kelvin T.; and Harris, Daniel C., 5,035,874, Cl. 423-509.000.
Harris, James E.: *See*—
Kawakami, James H.; Harris, James E.; Maresca, Louis M.; and Robeson, Lloyd M., 5,036,150, Cl. 528-173.000.
Hart, Charles R., to Imperial Chemical Industries plc. Polymeric films. 5,035,945, Cl. 428-323.000.
Hart, Timothy J.: *See*—
Davis, Lorne A., Jr.; Hart, Timothy J.; Moss, Robert M.; and Pepin, Gregory P., 5,036,193, Cl. 250-255.000.
Hartley, James L., to Life Technologies, Inc. Process for controlling contamination of nucleic acid amplification reactions. 5,035,996, Cl. 435-6.000.
Haruki, Toshinobu, to Sanyo Electric Co., Ltd. Automatic iris correction apparatus for use in automatically adjusting exposure in response to a video signal. 5,036,400, Cl. 358-228.000.
Haruta, Takashi; Nagano, Takaharu; Kishimoto, Takeyoshi; Yamada, Yasushi; and Yuno, Tomoko, to MEC Co., Ltd. Process for removing tin and tin-lead alloy from copper substrates. 5,035,749, Cl. 134-2.000.
Hasegawa, Akira: *See*—
Soeda, Koji; Kubota, Yoshiya; Okamoto, Shoji; Kubota, Akinori; Kobayashi, Michihito; Ijiri, Masaaki; Ozawa, Susumu; Tomosada, Kiyoshi; Irie, Nobuhiko; Hasegawa, Akira; Katayama, Hideaki; Murakami, Toshifumi; and Sakaguchi, Katsuyoshi, 5,035,591, Cl. 425-40.000.
Hasegawa, Kengo: *See*—
Aizawa, Kooji; Nii, Katsutoshi; Kawaike, Kazuhiko; Hasegawa, Kengo; Saruta, Akira; and Nakashima, Ryoichi, 5,035,519, Cl. 384-121.000.
Hasegawa, Morihiro; and Yamauchi, Takashi, to R. J. Reynolds Tobacco Company. Apparatus for continuous casting of metal strip. 5,035,278, Cl. 164-428.000.
Hasegawa, Takao; and Endo, Hideo. Embossed type separator for a storage battery. 5,035,967, Cl. 429-147.000.
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Hosaka, Sumio; Hosoki, Shigeyuki; and Hasegawa, Tsuyoshi, 5,036,196, Cl. 250-306.000.
Hashimoto Forming Industry Co., Ltd.: *See*—
Ohtake, Shinichi; and Tamura, Tatsuya, 5,035,096, Cl. 52-208.000.

Hashimoto, Kenji: *See*—
Tateishi, Yosuke; Takano, Norihisa; and Hashimoto, Kenji, 5,035,512, Cl. 374-142.000.
Hashimoto, Minoru; and Migita, Haruyoshi, to Sharp Kabushiki Kaisha. Paper shredder with service power outlet. 5,035,366, Cl. 241-36.000.
Hashimoto, Sadaaki: *See*—
Tomiyama, Takeshi; Hashimoto, Sadaaki; and Murase, Heihachi, 5,035,934, Cl. 428-40.000.
Hasircoglu, Alexander W.; and Humphrey, David T., to Du Pont de Nemours, E. I., and Company. Connector inject and eject cam lever assembly. 5,035,634, Cl. 439-157.000.
Hass, Jurgen; and Woller, Josef, to AMP Incorporated. Electrical connector for a data bus. 5,035,657, Cl. 439-748.000.
Hasse, Anja: *See*—
Schmidt, Jurgen; Furche, Thomas; Erdmann, Roland; Reichert, Marion; Bayer, Ullrich; Kurze, Peter; Schwarz, Thomas; Schreckenbach, Joachim; Kletke, Hans-Jurgen; Hoffmann, Andreas; Heppner, Martin; Hasse, Anja; Schmidt, Dorith; and Klaus, Annette, 5,035,781, Cl. 204-129.900.
Hassick, Denis E.; and Miknevich, Joseph P., to Calgon Corporation. Flocculation of suspended solids from aqueous solutions. 5,035,808, Cl. 210-728.000.
Hastrup, Sven, to Novo-Nordisk A/S. Expression system with transacting DNA segments. 5,036,002, Cl. 435-69.100.
Hata, Takeki: *See*—
Tada, Masuo; Hata, Takeki; Fukumoto, Takaaki; and Ohmori, Toshiaki, 5,035,750, Cl. 134-7.000.
Hata, Yoshiaki: *See*—
Hatamori, Osamu; Hata, Yoshiaki; Sumitani, Atsushi; Kobayashi, Haruo; and Kato, Kinya, 5,036,346, Cl. 354-195.120.
Inoue, Manabu; Taniguchi, Nobuyuki; Hata, Yoshiaki; Hoda, Takeo; Kudo, Yoshinobu; and Ueda, Hiroshi, 5,036,344, Cl. 354-106.000.
Hatakoshi, Genichi; Itaya, Kazuhiko; Naritsuka, Shigeya; Ishikawa, Masayuki; Okuda, Hajime; Shiozawa, Hideo; Watanabe, Yukio; Ohba, Yasuo; Kokubun, Yoshihiro; and Uematsu, Yutaka, to Kabushiki Kaisha Toshiba. Semiconductor laser device. 5,036,521, Cl. 372-46.000.
Hatamori, Osamu; Hata, Yoshiaki; Sumitani, Atsushi; Kobayashi, Haruo; and Kato, Kinya, to Minolta Camera Kabushiki Kaisha. Zooming apparatus for a viewfinder optical system. 5,036,346, Cl. 354-195.120.
Hattori, Yumi: *See*—
Shiokawa, Kozo; Tsuboi, Shinichi; Sasaki, Shoko; Moriya, Koichi; Hattori, Yumi; and Shibuya, Katsuhiko, 5,036,082, Cl. 514-338.000.
Hatzikazakis, Michael V.: *See*—
Carroll, John B.; and Hatzikazakis, Michael V., 5,035,582, Cl. 417-44.000.
Hauser, Ambrose A.: *See*—
Tseng, Wu-Yang; and Hauser, Ambrose A., 5,035,573, Cl. 415-173.200.
Hauzer Holding BV: *See*—
Lob, Horst, 5,036,252, Cl. 315-111.310.
Hayakawa, Kimiaki: *See*—
Hiroi, Masakazu; Naito, Masataka; Hayakawa, Kimiaki; Kobayashi, Kenji; and Mukasa, Mitsuhiro, 5,035,412, Cl. 270-053.000.
Hayakawa, Shigeru: *See*—
Fukumoto, Ryoichi; and Hayakawa, Shigeru, 5,035,453, Cl. 292-336.300.
Fukumoto, Ryoichi; Hayakawa, Shigeru; Torii, Nozomu; and Okudaira, Souichiro, 5,035,454, Cl. 292-337.000.
Hayasaka, Koro: *See*—
Kamigaki, Tomoo; Tokunaga, Ichiro; Yanagita, Satoshi; and Hayasaka, Koro, 5,035,960, Cl. 428-694.000.
Hayasaka, Toa: *See*—
Sonobe, Tadasi; Katane, Mamoru; Ikeguchi, Takashi; Matsumoto, Manabu; Ueda, Shinjiro; Kobari, Toshiaki; Takahashi, Takao; Hayasaka, Toa; and Kitayama, Toyoki, 5,036,290, Cl. 328-235.000.
Hayashi, Kazunoi, deceased; Hayashi, Masahiro, legal representative; and Hayashi, Masako, legal representative, to Fuji Photo Film Co., Ltd. Method for forming a direct positive image. 5,035,984, Cl. 430-378.000.
Hayashi, Masahiro, legal representative: *See*—
Hayashi, Kazunoi, deceased; Hayashi, Masahiro, legal representative; and Hayashi, Masako, legal representative, 5,035,984, Cl. 430-378.000.
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Hayashi, Ryutaro; Yoshino, Toshikazu; and Kimura, Yukio, to Pioneer Electronic Corporation. Optical recording disk. 5,036,510, Cl. 369-283.000.
Hayashi, Toshiaki: *See*—
Tokunaga, Akio; and Hayashi, Toshiaki, 5,035,966, Cl. 429-130.000.
Hayes Microcomputer Products, Inc.: *See*—
Halim, Raouf; and Shamlou, Daryush, 5,036,527, Cl. 375-98.000.
Hayet, Pascal: *See*—
Salembier, Philippe; and Hayet, Pascal, 5,036,388, Cl. 358-34.000.
Hazel, Barry D., to Allied-Signal Inc. Lens system for optic temperature sensor. 5,036,194, Cl. 250-227.210.
Hazenbroek, Jacobus R. On-line breast halver. 5,035,673, Cl. 452-149.000.
Healthtech Services Corp.: *See*—
Kaufman, Stephen B.; DiGianfilippo, Aleandro; Sager, Tamara L.; and Meyer, Alan R., 5,036,462, Cl. 364-413.010.
Heath, Raymond: *See*—
Reavell, James; and Heath, Raymond, 5,036,307, Cl. 340-487.000.
Hed, Aharon Z., to International Superconductor Corp. Switchable superconducting mirrors. 5,036,042, Cl. 505-1.000.
Hediger, Edwin A., to Eastman Kodak Company. LED array into floating focusing structure for differential expansion. 5,036,339, Cl. 346-107.00R.
Hedtmann-Rein, Carola; and Heinz, Gerhard, to BASF Aktiengesellschaft. High temperature resistant polysulfone-polyimide block copolycondensates and preparation thereof by melt condensation. 5,036,146, Cl. 525-436.000.
Hefti, Heinz: *See*—
Eckhardt, Claude; Hefti, Heinz; Meyer, Hans R.; and Weber, Kurt, 5,035,825, Cl. 252-95.000.
Heidelberger Druckmaschinen AG: *See*—
Jahn, Hans-Georg; Beisel, Hermann; and Seefried, Karl-Heinz, 5,035,178, Cl. 101-425.000.
Heilman, Robert J.; and Iler, H. Darrell, to Continental White Cap, Inc. Closure cap having tamper indicating means. 5,035,341, Cl. 215-230.000.
Heimann, Jochen. Sensor for non-invasive measurement of sound, pressure and vibration on the human body. 5,035,247, Cl. 128-715.000.
Heinemann, Ulrich; Kleefeld, Gerd; Dutzmann, Stefan; and Hansaler, Gerd, to Bayer Aktiengesellschaft. Pesticidal thiadiazole-substituted acrylic acid esters and intermediates therefor. 5,036,085, Cl. 514-361.000.
Heinrich, Michael: *See*—
Axelson, Peter; Heinrich, Michael; Lasko-Harvill, Ann; and Silverman, Michael W., 5,035,467, Cl. 297-440.000.
Heinz, Gerhard: *See*—
Hedtmann-Rein, Carola; and Heinz, Gerhard, 5,036,146, Cl. 525-436.000.
Heinz, Richard: *See*—
Willmann, Hartmut; Dittmann, Ludwig; Heinz, Richard; and Lutzeler, Jorn, 5,036,418, Cl. 360-108.000.
Heinze, Jurgen: *See*—
Jonas, Friedrich; Heywang, Gerhard; Schmidtberg, Werner; Heinze, Jurgen; and Dietrich, Michael, 5,035,926, Cl. 427-393.100.
Heisel, Michael; and Sporer, Josef. Process for treating wastewater which contains sour gases. 5,035,810, Cl. 210-750.000.
Heisey, J. Barry: *See*—
Braker, Brent L.; and Heisey, J. Barry, 5,035,209, Cl. 123-90.610.
Heitman, Lynn B. Method and apparatus for detecting location of a subterranean pipe. 5,036,497, Cl. 367-120.000.
Helbig, Wilfried: *See*—
Hagen, Helmut; Pfister, Juergen; Eichenauer, Ulrich; Wuerzer, Bruno; Helbig, Wilfried; and Westphalen, Karl-Otto, 5,035,736, Cl. 71-98.000.
Held, Jeffery S.; and Sharp, James W., to Stericycle, Inc. Method for disinfecting medical materials. 5,035,858, Cl. 422-21.000.
Helling, Daniel J.: *See*—
Helling, Robert W.; Helling, Daniel J.; and Rogers, Dean V., 5,035,104, Cl. 53-441.000.
Helling, Robert W.; Helling, Daniel J.; and Rogers, Dean V. Method of packaging easily damaged articles. 5,035,104, Cl. 53-441.000.
Hempton, Robert F., to Du Pont de Nemours, E. I., and Company. Method for cross-sectioning yarn samples. 5,035,761, Cl. 156-161.000.
Henderson, Ronald W.; and Blankenbaker, Paul, to Research Foundation of State University of New York, The. Lightning direction finder controller (LDFC). 5,036,334, Cl. 342-460.000.
Hendricks, Diana M.: *See*—
Smestad, Thomas L.; Prowse, Daniel; Chu, George H.; and Hendricks, Diana M., 5,035,715, Cl. 623-16.000.
Hengelmolen, Adrianus J., to Copermill Limited. Furnaces. 5,035,402, Cl. 266-88.000.
Henkel Kommanditgesellschft auf Aktien: *See*—
Hollenberg, Detlef; Schneider, Hans; and Weihrauch, Georg, 5,035,251, Cl. 132-112.000.
Henningsen Foods, Inc.: *See*—
Bergquist, Dwight H.; Lorimor, Gary D.; and Wildy, Thomas E., 5,035,067, Cl. 34-231.000.
Henri, Jean-Claude: *See*—
Andrieu, Jean-Pierre; Gault, Dominique; and Henri, Jean-Claude, 5,036,326, Cl. 342-176.000.
Heppner, Martin: *See*—
Schmidt, Jurgen; Furche, Thomas; Erdmann, Roland; Reichert, Marion; Bayer, Ullrich; Kurze, Peter; Schwarz, Thomas; Schreckenbach, Joachim; Kletke, Hans-Jurgen; Hoffmann, Andreas; Heppner, Martin; Hasse, Anja; Schmidt, Dorith; and Klaus, Annette, 5,035,781, Cl. 204-129.900.
Herbert, Nicholas: *See*—
Lyon, Russell R.; and Tash, Alan S., 5,035,692, Cl. 606-143.000.
Hermann, Allen M.; and Sheng, Zhengzhi, to University of Arkansas. R-Tl-Sr-Ca-Cu-O superconductors. 5,036,044, Cl. 505-1.000.
Hermanns, Ferdinand-Josef, to W. Schlafhorst AG & Co. Method and apparatus for avoiding ribbon windings when winding a cross-wound bobbin. 5,035,370, Cl. 242-18.100.

Herron, William L., to Trine Products Corp. Illuminated push button. 5,036,441, Cl. 362-95.000.

Hersen, Rene M. J.; and Soutier, Pascal-Marie P. M., to Societe Anonyme Dite Hispano-Suiza. Movable aircraft engine cowling. 5,035,379, Cl. 244-129.400.

Hertel AG Werkzeuge & Hartstoffe: *See*—
Kohlbauer, Johann; and Jager, Horst, 5,035,557, Cl. 409-233.000.

Hertel, Karl R.; and Wiegand, James H., to Envirex Inc. Reduced friction sprocket assembly for use in corrosive environments. 5,035,681, Cl. 474-152.000.

Herweh, John E.: *See*—
Echterling, Garry K.; and Herweh, John E., 5,036,145, Cl. 525-431.000.

Herwig, Jens: *See*—
Obrecht, Werner; Szentivanyi, Szolt; Sutter, Hubert; Herwig, Jens; and Kolwert, Alois, 5,036,149, Cl. 526-323.200.

Herz, Rudolf, to Leupold & Stevens. Method and apparatus for releasably mounting an optical device. 5,035,487, Cl. 350-245.000.

Herzog, Kenneth J. Automatic conveyorized container filler. 5,035,270, Cl. 141-116.000.

Hesse, Louis D., to Phoenix Lighting Products Corporation. Light bulb receptacle and method of assembly. 5,035,655, Cl. 439-699.000.

Hettich, Gerhard: *See*—
Burkard, Johannes; Hettich, Gerhard; and Schmid, Hans-Dieter, 5,035,137, Cl. 73-146.500.

Hetz, Mary N.; and Brothers, Bruce J., to Hot Cheeks, Inc. Convertible mask, ascot and visor garment and method of conversion therebetween. 5,035,006, Cl. 2-209.100.

Heuvelmans, Joannes H. A.; and Goslinga, Hieltje. Method for carrying out hemodynamic measurements on a patient and flow-directed balloon catheter used for this. 5,035,246, Cl. 128-673.000.

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Abdel-Rahman, Mahmoud F., 5,035,138, Cl. 73-204.150.
Braun, David M., 5,035,770, Cl. 156-643.000.
Hubby, Laurence M., Jr., 5,035,490, Cl. 350-337.000.
Mastache, Mark D., 5,036,416, Cl. 360-105.000.
Osborne, William S., 5,036,340, Cl. 346-140.00R.
Rau, Bantwal R.; and Towle, Ross A., 5,036,454, Cl. 364-200.000.

Heywang, Gerhard: *See*—
Jonas, Friedrich; Heywang, Gerhard; Schmidtberg, Werner; Heinze, Jurgen; and Dietrich, Michael, 5,035,926, Cl. 427-393.100.

Hibino, Hiroki: *See*—
Kubokawa, Hiroaki; Tsukaya, Takashi; Ueda, Yasuhiro; Ohshima, Yutaka; Nakamura, Takeaki; Hibino, Hiroki; Takayama, Shuichi; and Hagino, Tadao, 5,035,231, Cl. 128-6.000.

Hickmann, Gerd: *See*—
Pfalzgraf, Manfred; Hickmann, Gerd; and Mausner, Eberhard, 5,035,213, Cl. 123-336.000.

Hicks, John E.: *See*—
Meyer, Allen D.; and Hicks, John E., 5,035,108, Cl. 56-13.400.

Hidaka, Yasuharu, to NEC Corporation. Bloch-line memory device capable of stably generating a magnetic domain. 5,036,485, Cl. 365-29.000.

Higa, Kelvin T.; and Harris, Daniel C., to United States of America, Navy. Diallyl telluride and synthesis of diorgano tellurides. 5,035,874, Cl. 423-509.000.

Higashio, Kimihiko: *See*—
Nishimori, Kadotaro; Ito, Masazumi; Higashio, Kimihiko; and Kato, Akio, 5,036,357, Cl. 355-202.000.

Higgins, Alan L.: *See*—
Wrench, Edwin H., Jr.; and Higgins, Alan L., 5,036,539, Cl. 381-43.000.

Higuchi, Yasushi: *See*—
Yamane, Hiroyuki; and Higuchi, Yasushi, 5,036,019, Cl. 437-57.000.

Hikima, Hiroshi: *See*—
Sugino, Takao; Kawamura, Toshio; Asai, Masamichi; Yamada, Hiroshi; Mukoyama, Kenichi; Takahashi, Akira; and Hikima, Hiroshi, 5,035,919, Cl. 427-140.000.

Hiles, Brian A., to Malyne Enterprises, Inc. High intensity lamp. 5,036,444, Cl. 362-188.000.

Hill, Robert M.; and Barksdale, Gordon, to Eastport International. Shallow water pipeline tracker system. 5,035,540, Cl. 405-157.000.

Hills, Robert G., to Eastman Kodak Company. Integrated circuit card and electronic apparatus for use therewith. 5,036,430, Cl. 361-399.000.

Himmelsbach, Richard; Hodges, John C.; Kaltenbronn, James S.; Patt, William C.; Repine, Joseph T.; and Sircar, Ila, to Warner-Lambert Company. Diol-containing renin inhibitors. 5,036,053, Cl. 514-19.000.

Himont Italia S.r.l.: *See*—
Massa, Vincenzo; Merlo, Fabrizio; and Casolo Ginelli, Uberto, 5,035,924, Cl. 427-299.000.

Himstedt, Alan L., to Dow Corning Corporation. Protective coating for electrical components. 5,036,131, Cl. 524-786.000.

Hinoshita, Hirotaka: *See*—
Tanaka, Shoji; Yamauchi, Hisao; Yamada, Yukio; Ohnuki, Masayoshi; Morita, Etsuji; Toyoshima, Mitsunobu; Wada, Yasuo; Hinoshita, Hirotaka; Ikeda, Wataru; Aihara, Etsuji; Kobayashi, Tutomu; and Suguro, Kuniaki, 5,035,597, Cl. 425-135.000.

Hioki, Toshiaki: *See*—
Watanabe, Hiroshi; Hioki, Toshiaki; and Morita, Yosihiko, 5,036,404, Cl. 358-337.000.

Hirabayashi, Kimitaka: *See*—
Adachi, Kazumasa; Takahashi, Shinji; and Hirabayashi, Kimitaka, 5,036,431, Cl. 361-412.000.

Hirabayashi, Satoshi: *See*—
Kiyonari, Toshiyuki; Hirabayashi, Satoshi; and Kidokoro, Naoto, 5,035,983, Cl. 430-346.000.

Hiraishi, Shigetoshi: *See*—
Sekine, Mikiya; and Hiraishi, Shigetoshi, 5,036,039, Cl. 503-217.000.

Hiramatsu, Michio: *See*—
Suzuki, Yoshio; and Hiramatsu, Michio, 5,035,052, Cl. 29-890.046.

Hiramatsu, Yoshiyuki: *See*—
Shibata, Mitsuru; Hiramatsu, Yoshiyuki; Adachi, Ryoichi; and Mitsutake, Kenichiro, 5,035,739, Cl. 71-91.000.

Hirano, Shigeo; Murai, Ashita; and Suzuki, Seiji, to Fuji Photo Film Co., Ltd. Silver halide photographic material. 5,035,993, Cl. 430-598.000.

Hirobe, Toshihiko: *See*—
Miyago, Makoto; Oka, Hiroshi; Imaya, Akihiko; Kato, Hiroaki; Nagayasu, Takayoshi; and Hirobe, Toshihiko, 5,036,370, Cl. 357-4.000.

Hiroi, Masakazu; Naito, Masataka; Hayakawa, Kimiaki; Kobayashi, Kenji; and Mukasa, Mitsuhiro, to Canon Kabushiki Kaisha. Control method for a sorter. 5,035,412, Cl. 270-053.000.

Hirota, Hajime: *See*—
Takamura, Hiromi; Kamegai, Jun; and Hirota, Hajime, 5,035,832, Cl. 252-174.150.

Hirotsu, Sadao: *See*—
Utsunomiya, Takeshi; Hoshino, Kazuo; and Hirotsu, Sadao, 5,035,855, Cl. 420-61.000.

Hirschmanner, Franz: *See*—
Rametsteiner, Hermann; Schwaha, Karl; Hirschmanner, Franz; and Bramerdorfer, Heinz, 5,035,279, Cl. 164-428.000.

Hisazumi, Nobuyuki: *See*—
Matsukura, Yoshihiro; Hisazumi, Nobuyuki; and Shibuya, Kunio, 5,035,955, Cl. 428-520.000.

Hitachi, Ltd.: *See*—
Aizawa, Kooji; Nii, Katsutoshi; Kawaike, Kazuhiko; Hasegawa, Kengo; Saruta, Akira; and Nakashima, Ryoichi, 5,035,519, Cl. 384-121.000.
Bergmans, Johannes W. M.; Mita, Seiichi; Izumita, Morishi; and Doi, Nobukazu, 5,036,524, Cl. 375-12.000.
Hosaka, Sumio; Hosoki, Shigeyuki; and Hasegawa, Tsuyoshi, 5,036,196, Cl. 250-306.000.
Hosoya, Rituko; Yamada, Takahiro; and Musya, Masataka, 5,035,624, Cl. 434-309.000.
Ishikawa, Akira; Ito, Yukio; Okamoto, Hiroshi; Kudo, Tetsuichi; and Miyauchi, Katsuki, 5,035,478, Cl. 350-96.120.
Kanamaru, Hisanobu; and Asahi, Naotatsu, 5,035,677, Cl. 464-138.000.
Sonobe, Tadasi; Katane, Mamoru; Ikeguchi, Takashi; Matsumoto, Manabu; Ueda, Shinjiro; Kobari, Toshiaki; Takahashi, Takao; Hayasaka, Toa; and Kitayama, Toyoki, 5,036,290, Cl. 328-235.000.
Tsukada, Masamichi; and Tobe, Hayato, 5,035,505, Cl. 356-319.000.
Yada, Masami; Funamoto, Takao; Kitamura, Michio; Komatsu, Junzo; Midorikawa, Masakazu; and Yoshikawa, Tsugio, 5,035,579, Cl. 416-241.00R.

Hitachi, Ltd: *See*—
Noguchi, Kouki; Akizawa, Mitsuru; and Kato, Kanji, 5,036,486, Cl. 365-49.000.

Hitachi Maxell, Ltd.: *See*—
Kawarai, Seigi; Kuse, Sadamu; and Orita, Yasushi, 5,035,947, Cl. 428-329.000.
Noguchi, Kouki; Akizawa, Mitsuru; and Kato, Kanji, 5,036,486, Cl. 365-49.000.

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Iida, Yoshihiko; Ikeda, Mitsuru; Ishikawa, Ken; and Horiba, Isao, 5,036,545, Cl. 382-62.000.

Hitachi Powdered Metals Co., Ltd.: *See*—
Kanamaru, Hisanobu; and Asahi, Naotatsu, 5,035,677, Cl. 464-138.000.

Hjelm, John R.; and Larson, Richard D., to Audio Research Corporation. Decoupled electrolytic capacitor. 5,036,292, Cl. 330-202.000.

Hoda, Takeo; Taniguchi, Nobuyuki; and Seigenji, Kiyoshi, to Minolta Camera Kabushiki Kaisha. Film cartridges, films and cameras adapted for use therewith. 5,036,342, Cl. 354-21.000.

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Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Nakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, 5,036,350, Cl. 354-475.000.

Hodges, John C.: *See*—
Himmelsbach, Richard; Hodges, John C.; Kaltenbronn, James S.; Patt, William C.; Repine, Joseph T.; and Sircar, Ila, 5,036,053, Cl. 514-19.000.

Hodgkins, David H., to Parker Hannifin Corporation. Liquid separation and recovery apparatus for fuel tank vent line. 5,035,729, Cl. 55-168.000.

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Dietz, Erwin; and Urban, Manfred, 5,035,747, Cl. 106-495.000.
Lattrell, Rudolf; Durckheimer, Walter; and Seibert, Gerhard, 5,036,063, Cl. 514-192.000.

Hoechst Celanese Corporation: *See*—
Potvin, Robert E.; St. Alban, Jonas O.; and Sobodacha, Chester J., 5,035,976, Cl. 430-165.000.

Hoechst-Roussel Pharmaceuticals Incorporated: *See—*
Hrib, Nicholas J.; Shoger, Kirk D.; and Tegeler, John J., 5,036,152, Cl. 544-57.000.
Hoefelmayr, Tilman; and Schulz, Dieter, to Biomelktechnik Hoefelmayr & Co. Process and a device for carrying out measurements at a foaming liquid. 5,035,139, Cl. 73-223.000.
Hoekstra, Albert, to U.S. Philips Corp. Shaving apparatus. 5,035,053, Cl. 30-43.600.
Hoetzl, Max; and Lingle, Thomas M., to Surface Combustion, Inc. Internal heat exchange tubes for inductrial furnaces. 5,035,610, Cl. 432-77.000.
Hoffman, Erik L., to Ordev B.V. Self-adjusting prosthesis attachment. 5,035,712, Cl. 623-16.000.
Hoffmann, Andreas: *See—*
Schmidt, Jurgen; Furche, Thomas; Erdmann, Roland; Reichert, Marion; Bayer, Ullrich; Kurze, Peter; Schwarz, Thomas; Schreckenbach, Joachim; Kletke, Hans-Jurgen; Hoffmann, Andreas; Heppner, Martin; Hasse, Anja; Schmidt, Dorith; and Klaus, Annette, 5,035,781, Cl. 204-129.900.
Hoffmann, Friedrich; and Wings, Leo, to U.S. Philips Corporation. Car headlight lamp and method of manufacturing same. 5,036,439, Cl. 362-61.000.
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Hoffmann-La Roche Inc.: *See—*
Bachynsky, Maria O.; Infeld, Martin H.; Margolis, Richard J.; and Perla, Dennis A., 5,036,102, Cl. 514-455.000.
Fischer, Ulf; Schneider, Fernand; and Widmer, Ulrich, 5,036,066, Cl. 514-211.000.
Gotschi, Erwin, 5,036,064, Cl. 514-206.000.
Hsu, Ming-Chu; and Tam, Steve Y., 5,036,101, Cl. 514-423.000.
Hogan, Billy M.: *See—*
Dunn, Paul S.; Sheinberg, Haskell; Hogan, Billy M.; Lewis, Homer D.; and Dickinson, James M., 5,035,854, Cl. 420-3.000.
Hogenboom, Eric H. M.; and Bruinink, Peter, to Stamicarbon B.V. Combinations of polymer filaments or yarns having a low coefficient of friction and filaments or yarns having a high coefficient of friction, and use thereof. 5,035,111, Cl. 57-224.000.
Hohmann, Jere W.; Rogers, Bruce J.; Ransom, Stephen A.; and Clementi, Daniel M., to Integrated Circuit Systems, Inc. Video dot clock generator. 5,036,216, Cl. 309-269.000.
Hokushin Corporation: *See—*
Kitamura, Kanji; and Kawamoto, Shuichi, 5,035,499, Cl. 351-153.000.
Hollberg, Peter J.; and Swann, James C., to Du Pont de Nemours, E. I., and Company. Headbox with concave auxiliary blade. 5,035,773, Cl. 162-347.000.
Hollenberg, Detlef; Schneider, Hans; and Weihrauch, Georg, to Henkel Kommanditgesellschft auf Aktien. Hair treatment media application device. 5,035,251, Cl. 132-112.000.
Holley, Susan M.: *See—*
Cayias, John L.; Holley, Susan M.; and Lichtenberger, Gunter J., 5,035,287, Cl. 166-250.000.
Hollingsworth, Elmont E., to Minnesota Mining and Manufacturing Company. Disc stack connector. 5,035,636, Cl. 439-215.000.
Holm-Kennedy, James W.; and Umemoto, Donald K., to Research Corporation of the University of Hawaii, The. Magnetic and electric force sensing method and apparatus. 5,036,286, Cl. 324-661.000.
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Langley, John; Symes, Kenneth C.; and Holm, Peter, 5,035,900, Cl. 424-484.000.
Holy, Zdenek: *See—*
Beran, Jaroslav; Pavlu, Milos; Prasil, Vladimir; Holy, Zdenek; Pesek, Frantisek; Vitamvas, Zdenek; and Vitak, Josef, 5,035,369, Cl. 242-18.0DD.
Honan, William J.: *See—*
Page, Robert L. G.; and Honan, William J., 5,035,462, Cl. 296-183.000.
Honda Giken Kogyo Kabushiki Kaisha: *See—*
Aoki, Takashi; Terayama, Satoshi; and Miyake, Junichi, 5,035,157, Cl. 74-866.000.
Kawashita, Hiroichi; and Komatsu, Yasunori, 5,035,282, Cl. 165-133.000.
Nakayama, Hiroshi; Shimada, Hiroyuki; and Yumoto, Toshiyuki, 5,035,682, Cl. 475-66.000.
Honda, Hiroaki: *See—*
Harigane, Kotaro; Takahashi, Kenichi; and Honda, Hiroaki, 5,035,047, Cl. 29-740.000.
Honeywell Inc.: *See—*
Bhanu, Bir; and Burger, Wilhelm, 5,036,474, Cl. 364-516.000.
Dannenberg, Paul H., 5,036,327, Cl. 342-201.000.
Kemplin, Steven C., 5,036,316, Cl. 340-728.000.
Peterson, Scott M., 5,035,607, Cl. 431-46.000.
Spielberger, Richard K.; and Dunaway, Thomas J., 5,036,163, Cl. 174-52.400.
Zweifel, Terry L.; and Barrios, J. Rene, 5,036,480, Cl. 364-578.000.
Honeywell Information Systems Inc.: *See—*
Koegel, Robert J., 5,036,456, Cl. 364-200.000.
Honeywell Regelsysteme GmbH: *See—*
Westell, William E., 5,036,398, Cl. 358-214.000.
Honkanen, Seppo; Tammela, Simo; and Tervonen, Ari, to Oy Nokia Ab. Method of producing optical waveguides. 5,035,734, Cl. 65-30.130.
Honkomp, Glenn A.; Tingley, Eugene H.; McNay, Thomas O.; and Bowsky, Benjamin, to Emerson Electric Co. Terminal block for a hermetic terminal assembly. 5,035,653, Cl. 439-622.000.
Hoots, John E.: *See—*
Fong, Dodd W.; and Hoots, John E., 5,035,806, Cl. 210-701.000.
Hopkins, Ronald J.: *See—*
Land, John T.; Hopkins, Ronald J.; and Ford, Daniel E., 5,035,852, Cl. 376-353.000.
Hopmans, Franciscus P. M.: *See—*
den Haan, Petrus A. M.; and Hopmans, Franciscus P. M., 5,036,459, Cl. 364-200.000.
Hordon, Monroe J.: *See—*
Kowalczyk, Lawrence E.; Badesha, Santokh S.; Zukoski, Paul F.; Hordon, Monroe J.; Sterling, Steven M.; Lees, Barry A.; Elder, Frederick A.; and LaForce, Roger W., 5,035,857, Cl. 420-579.000.
Horiba, Isao: *See—*
Iida, Yoshihiko; Ikeda, Mitsuru; Ishikawa, Ken; and Horiba, Isao, 5,036,545, Cl. 382-62.000.
Horie, Seiji; and Makino, Naonori, to Fuji Photo Film Co., Ltd. Electrophotographic photoreceptor with phthalocyanine in styrenemaleic anhydride half-ester binder. 5,035,968, Cl. 430-58.000.
Horie, Seiji: *See—*
Kondo, Syunichi; Yokoya, Hiroaki; and Horie, Seiji, 5,035,969, Cl. 430-83.000.
Horita, Yoshiyuki; Nakayama, Kiyoshi; Sugimoto, Yasuhiko; Kikukawa, Norio; Yamaguchi, Yoshiharu; and Funakawa, Shigeru, to Yoshida Kogyo K.K. Slide fastener and fastener elements therefor. 5,035,029, Cl. 24-394.000.
Hornby, Michael J.; Spiers, Dean; and Cranford, Stephen, to Siemens Automotive L.P. Clip retention of a split-stream fuel injector to a fuel rail cup including circumferential locator. 5,035,224, Cl. 123-470.000.
Hosaka, Sumio; Hosoki, Shigeyuki; and Hasegawa, Tsuyoshi, to Hitachi, Ltd. Surface microscope. 5,036,196, Cl. 250-306.000.
Hoseney, R. Carl: *See—*
Huang, Victor T.; Hoseney, R. Carl; Graf, Ernst; Ghiasi, Katy; Miller, Linda C.; Weber, Jean L.; Gaertner, Karin C.; Matson, Kristin L.; Hunstiger, Antoinette M.; Rogers, Deborah K.; and Saguy, Israel A., 5,035,904, Cl. 426-243.000.
Hoshino, Kazuo: *See—*
Utsunomiya, Takeshi; Hoshino, Kazuo; and Hirotsu, Sadao, 5,035,855, Cl. 420-61.000.
Hoshizaki Denki Kabushiki Kaisha: *See—*
Hara, Yasuo, 5,035,118, Cl. 62-126.000.
Hosiden Electronics Co., Ltd.: *See—*
Shibano, Yasuji, 5,035,652, Cl. 439-610.000.
Hosokawa, Yoshio: *See—*
Tamura, Yutaka; Hosokawa, Yoshio; Noro, Satoshi; and Kondo, Kazuhiko, 5,036,471, Cl. 364-449.000.
Hosoki, Shigeyuki: *See—*
Hosaka, Sumio; Hosoki, Shigeyuki; and Hasegawa, Tsuyoshi, 5,036,196, Cl. 250-306.000.
Hosoya, Atsushi; and Tsuchiya, Eiichi, to Victor Company of Japan, Ltd. Magnetic tape transport mechanism which absorbs magnetic tape oscillations and vibrations in the vicinity of a rotational drum. 5,036,411, Cl. 360-85.000.
Hosoya, Rituko; Yamada, Takahiro; and Musya, Masataka, to Hitachi, Ltd. Presentation apparatus. 5,035,624, Cl. 434-309.000.
Hot Cheeks, Inc.: *See—*
Hetz, Mary N.; and Brothers, Bruce J., 5,035,006, Cl. 2-209.100.
Houghton, Anthony T., to British Nuclear Fuels plc. Container for nuclear fuel elements. 5,035,342, Cl. 220-23.200.
Houle, William A.; and Tufano, Thomas P., to Du Pont de Nemours, E. I., and Company. Process for the stabilization of high-chloride crystals with modified crystal habit using bromide shells. 5,035,992, Cl. 430-569.000.
House B. M. Co., Ltd.: *See—*
Ajimi, Kunio, 5,035,550, Cl. 408-204.000.
Hovis, William P.: *See—*
Busch, Robert E.; Hovis, William P.; Redman, Theodore M.; Thoma, Endre P.; and Yankosky, James A., 5,036,495, Cl. 365-233.000.
Hoya Optics Inc.: *See—*
Lin, Yeong, 5,036,025, Cl. 501-48.000.
Hoyte, Otho P.: *See—*
Fabricius, Dietrich M.; and Hoyte, Otho P., 5,035,990, Cl. 430-567.000.
HPI Health Protection, Inc.: *See—*
Kolsky, Rodger E., 5,034,998, Cl. 2-2.000.
HPM Corporation: *See—*
Kruder, George A., 5,035,509, Cl. 366-89.000.
HR Textron Inc.: *See—*
Amico, Russell P.; and Klier, George M., 5,035,264, Cl. 137-625.650.
Hrib, Nicholas J.; Shoger, Kirk D.; and Tegeler, John J., to Hoechst-Roussel Pharmaceuticals Incorporated. Alkoxycarbonylalkylphospholipids and alkylaminocarbonylalkylphospholipids. 5,036,152, Cl. 544-57.000.
Hsieh, Bing R.; Gruber, Robert J.; Moffat, Karen A.; Mychajlowskij, Walter; and Paine, Anthony J., to Xerox Corporation. Encapsulated toner compositions and processes thereof. 5,035,970, Cl. 430-109.000.
Hsu, Hui-Pin: *See—*
Friedenthal, Kenneth J.; de La Chapelle, Michael; and Hsu, Hui-Pin, 5,035,375, Cl. 244-3.120.

Hsu, Ming-Chu; and Tam, Steve Y., to Hoffmann-La Roche Inc. Method for treating retroviral infections with aryl-(2-pyrryl) ketone compound. 5,036,101, Cl. 514-423.000.
Huang, Dora H. Wrench. 5,035,161, Cl. 81-54.000.
Huang, En L. Automobile window protector. 5,035,460, Cl. 296-95.100.
Huang, Liang Y.; and Chen, San Y., to Industrial Technology Research Institute. Pressurized slurry casting machine for producing ceramic articles. 5,035,593, Cl. 425-85.000.
Huang, Victor T.; Hoseney, R. Carl; Graf, Ernst; Ghiasi, Katy; Miller, Linda C.; Weber, Jean L.; Gaertner, Karin C.; Matson, Kristin L.; Hunstiger, Antoinette M.; Rogers, Deborah K.; and Saguy, Israel A., to Pillsbury Company, The. Starch-based products for microwave cooking or heating. 5,035,904, Cl. 426-243.000.
Hubbell Incorporated: *See*—
Ehrenfels, Alfred L.; Lutz, David; and Parker, Martin, 5,035,646, Cl. 439-536.000.
Hubby, Laurence M., Jr., to Hewlett-Packard Company. Fiber optic. 5,035,490, Cl. 350-337.000.
Huber, James V.; Patel, Bhakti S.; and Tikhtman, Jacob, to Atlas Electric Devices Company. Lamp cooling system. 5,036,242, Cl. 313-35.000.
Huber, Jurgen: *See*—
von Gentzkow, Wolfgang; Huber, Jurgen; Rogler, Wolfgang; and Wilhelm, Dieter, 5,036,135, Cl. 524-786.000.
Hudson, Gregory L.; Issa, Khaled M.; Richards, Randall R.; and Sprick, William L., to Caterpillar Inc. Engine flow restriction control. 5,035,212, Cl. 123-323.000.
Huels Aktiengesellschaft: *See*—
Weiss, Joern-Vollker, 5,036,144, Cl. 525-423.000.
Hughes Aircraft Company: *See*—
Chapman, C. Weldon; and Miller, Thomas W., 5,036,333, Cl. 342-370.000.
Frank, Jack D., 5,036,206, Cl. 250-467.100.
Friedenthal, Kenneth J.; de La Chapelle, Michael; and Hsu, Hui-Pin, 5,035,375, Cl. 244-3.120.
Gardos, Michael N.; Lipp, Larry C.; and Griffin, William S., 5,035,836, Cl. 252-511.000.
Moss, Gaylord E.; Cohn, Brian D.; Chern, Mao-Jin J.; Cook, Lacy G.; and Ferrer, John J., 5,035,474, Cl. 350-3.700.
O'Brien, Edwin L., 5,036,325, Cl. 342-160.000.
Wilson, Douglas W., 5,036,236, Cl. 310-90.500.
Hughes, Paul: *See*—
Franklin, David; Franklin, Joseph; and Hughes, Paul, 5,035,242, Cl. 128-420.500.
Huin, Didier; and Riboud, Paul-Victor, to Institut de Recherches de la Siderurgie Francaise. Process and apparatus for the continuous casting of fine metal wire. 5,035,280, Cl. 164-463.000.
Huin, Roland: *See*—
Dang Vu, Quang; Huin, Roland; and Euzen, Jean-Paul, 5,035,867, Cl. 422-200.000.
Hulin, Bernard: *See*—
Clark, David A.; Goldstein, Steven W.; and Hulin, Bernard, 5,036,079, Cl. 514-333.000.
Hultberg, Leif: *See*—
Petersson, Nils, 5,035,570, Cl. 414-778.000.
Humble, Wayne; and Spector, George. Proximity light. 5,036,443, Cl. 362-183.000.
Humphrey, David T.: *See*—
Hasircoglu, Alexander W.; and Humphrey, David T., 5,035,634, Cl. 439-157.000.
Hung, Huang C. Inflight headset for civil aircraft. 5,035,005, Cl. 2-209.000.
Hunia, Robert M.: *See*—
Lin, Chia-Cheng; Basil, John D.; and Hunia, Robert M., 5,035,745, Cl. 106-287.160.
Hunstiger, Antoinette M.: *See*—
Huang, Victor T.; Hoseney, R. Carl; Graf, Ernst; Ghiasi, Katy; Miller, Linda C.; Weber, Jean L.; Gaertner, Karin C.; Matson, Kristin L.; Hunstiger, Antoinette M.; Rogers, Deborah K.; and Saguy, Israel A., 5,035,904, Cl. 426-243.000.
Hunt, Freddie E.: *See*—
Russell, Richard J.; Hunt, Freddie E.; and Chung, Frank K., 5,036,304, Cl. 335-209.000.
Hupka, Rolf; and Wiechering, Christian, to Dr. Ing. Rudolf Hell GmbH. Mode of operating of a circuit arrangement for improving the bounce behavior of print form engraving systems. 5,036,403, Cl. 358-299.000.
Hurlburt, John H.: *See*—
Buckley, Stephen P.; Robinson, Richard A.; Hurlburt, John H.; Pfahl, Kurt A.; and Doerflinger, Arthur E., 5,036,472, Cl. 364-479.000.
Husky Injection Molding Systems Ltd.: *See*—
Unterlander, Rick; and Fok, Tai C., 5,035,603, Cl. 425-522.000.
Hussein, Mamoun M.; Barcelon, Shirley A.; and Lynch, Donald M., to Warner-Lambert Company. Combination of formate esters and pepper-like constituents as an orally-consumable chloroform substitute. 5,035,882, Cl. 424-58.000.
Husted, Martin D.: *See*—
Brownhill, Richard; and Husted, Martin D., 5,036,428, Cl. 361-386.000.
Hwo, Charles C., to Shell Oil Company. Film from blend of ethylene polymers, ethylene butene polymer and propylene polymers. 5,036,140, Cl. 525-222.000.
Hynbrood Pty. Limited: *See*—
Page, Robert L. G.; and Honan, William J., 5,035,462, Cl. 296-183.000.
I.K. Trading Aps.: *See*—
Nielsen, Erik; and Hansen, Erland, 5,035,575, Cl. 416-9.000.
Ibico Inter Binding G.m.b.H.: *See*—
Loibl, Bernd, 5,035,561, Cl. 412-33.000.
Ibiden Co., Ltd.: *See*—
Adachi, Kazumasa; Takahashi, Shinji; and Hirabayashi, Kimitaka, 5,036,431, Cl. 361-412.000.
Ichie, Koji: *See*—
Ellis, Gordon W.; and Ichie, Koji, 5,035,476, Cl. 350-6.500.
Ichikawa, Makoto: *See*—
Nakada, Kazuhiko; Yasuda, Akihiro; and Ichikawa, Makoto, 5,035,710, Cl. 623-6.000.
Ichikawa, Yasunori; Ohnishi, Hiroshi; Urabe, Shigeharu; Kojima, Akira; and Katoh, Akira, to Fuji Photo Film Co., Ltd. Control process and apparatus for the formation of silver halide grains. 5,035,991, Cl. 430-569.000.
Ichikoh Industries, Ltd.: *See*—
Nakata, Yutaka, 5,036,438, Cl. 362-61.000.
ICI Pharma: *See*—
Bruneau, Pierre A. R., 5,036,083, Cl. 514-338.000.
Ide, Satoshi: *See*—
Tamura, Kohji; Omure, Yukio; and Ide, Satoshi, 5,035,828, Cl. 252-170.000.
Idebro, Mats: *See*—
Kokkeler, Franciscus; Idebro, Mats; Cigarini, Enzo; and Fioroli, Mario, 5,036,172, Cl. 219-10.55M.
Idemitsu Kosan Company Limited: *See*—
Shibata, Mitsuru; Hiramatsu, Yoshiyuki; Adachi, Ryoichi; and Mitsutake, Kenichiro, 5,035,739, Cl. 71-91.000.
Igarashi, Toshio; Wakatsuki, Akira; Sudo, Kenichi; and Shida, Yuu, to Sumitomo Chemical Company, Limited. Polyvinyl chloride resin composition for powder molding. 5,036,124, Cl. 524-298.000.
Iglesia, Enrique; Vroman, Hilda; Soled, Stuart; Baumgartner, Joseph; and Fiato, Rocco A., to Exxon Research and Engineering Company. Selective catalysts and their preparation for catalytic hydrocarbon synthesis. 5,036,032, Cl. 502-260.000.
Iguchi, Satoshi: *See*—
Katsuno, Toshiyasu; Iguchi, Satoshi; and Chujo, Yoshiki, 5,035,358, Cl. 239-403.000.
Iida, Kozo: *See*—
Baba, Shigeo; Shibata, Yukio; Kawamura, Takahiro; Takaoka, Hideo; Kimura, Tsuguo; Kousaka, Kazuo; Minato, Yoshihiro; Yokoyama, Naruo; Iida, Kozo; and Imai, Tetsuya, 5,036,035, Cl. 502-221.000.
Iida, Masaru; Iwamasa, Akiyoshi; and Tonomoto, Yoshihiro, to Fujitsu Limited. Method of toner detection for replenishment in a developer. 5,036,363, Cl. 355-246.000.
Iida, Yoshihiko; Ikeda, Mitsuru; Ishikawa, Ken; and Horiba, Isao, to Hitachi Medical Corporation. Picture image reading system. 5,036,545, Cl. 382-62.000.
Iijima, Chiyoaki; Sato, Yuzuru; Wada, Hiroshi; Okumura, Osamu; and Kamada, Satoshi, to Seiko Epson Corporation. Liquid crystal device having two super twisted nematic cells. 5,035,489, Cl. 350-335.000.
Iijima, Yoshio, to Daido Metal Company Ltd. Method of manufacturing a bearing bush. 5,035,051, Cl. 29-898.054.
Ijiri, Masaaki: *See*—
Soeda, Koji; Kubota, Yoshiya; Okamoto, Shoji; Kubota, Akinori; Kobayashi, Michihito; Ijiri, Masaaki; Ozawa, Susumu; Tomosada, Kiyoshi; Irie, Nobuhiko; Hasegawa, Akira; Katayama, Hideaki; Murakami, Toshifumi; and Sakaguchi, Katsuyoshi, 5,035,591, Cl. 425-40.000.
Ikebe, Masaru: *See*—
Kaneda, Hiroshi; and Ikebe, Masaru, 5,036,421, Cl. 360-133.000.
Ikeda, Mitsuru: *See*—
Iida, Yoshihiko; Ikeda, Mitsuru; Ishikawa, Ken; and Horiba, Isao, 5,036,545, Cl. 382-62.000.
Ikeda, Wataru: *See*—
Tanaka, Shoji; Yamauchi, Hisao; Yamada, Yukio; Ohnuki, Masayoshi; Morita, Etsuji; Toyoshima, Mitsunobu; Wada, Yasuo; Hinoshita, Hirotaka; Ikeda, Wataru; Aihara, Etsuji; Kobayashi, Tutomu; and Suguro, Kuniaki, 5,035,597, Cl. 425-135.000.
Ikeguchi, Takashi: *See*—
Sonobe, Tadasi; Katane, Mamoru; Ikeguchi, Takashi; Matsumoto, Manabu; Ueda, Shinjiro; Kobari, Toshiaki; Takahashi, Takao; Hayasaka, Tos; and Kitayama, Toyoki, 5,036,290, Cl. 328-235.000.
Ikenaga, Kouichi; and Arai, Tatsuo, to Mitsubishi Metal Corporation. Insert clamped tool. 5,035,544, Cl. 407-105.000.
Ikenoue, Yoshikazu: *See*—
Yamaguchi, Ikunori; and Ikenoue, Yoshikazu, 5,036,476, Cl. 364-519.000.
Ilenda, Casmir S.; Frantz, Thomas M.; and Freed, William T., to Rohm and Haas Company. Plastic articles with compatibilized barrier resin. 5,035,933, Cl. 428-36.600.
Iler, H. Darrell: *See*—
Heilman, Robert J.; and Iler, H. Darrell, 5,035,341, Cl. 215-230.000.
Illinois Tool Works, Inc.: *See*—
Nilsen, Martin J., 5,035,559, Cl. 411-508.000.
Imae, Michito; and Miki, Chihiro, to Communications Research Laboratory Ministry of Post and Telecommunications. Ranging system using correlation between two spread spectrum wave signals. 5,036,330, Cl. 342-357.000.
Imai, Saburo, to Seiko Instruments Inc. Printing head drive apparatus with inertia control. 5,036,338, Cl. 346-76.0PH.

Imai, Tetsuya: *See—*
Baba, Shigeo; Shibata, Yukio; Kawamura, Takahiro; Takaoka, Hideo; Kimura, Tsuguo; Kousaka, Kazuo; Minato, Yoshihiro; Yokoyama, Naruo; Iida, Kozo; and Imai, Tetsuya, 5,036,035, Cl. 502-221.000.

Imaya, Akihiko: *See—*
Miyago, Makoto; Oka, Hiroshi; Imaya, Akihiko; Kato, Hiroaki; Nagayasu, Takayoshi; and Hirobe, Toshihiko, 5,036,370, Cl. 357-4.000.

IMI Cornelius Inc.: *See—*
Cook, Christopher M., 5,035,121, Cl. 62-389.000.

Imit, A.C.: *See—*
Lomelin, Juan M.; and Vaqueiro, Maria C., 5,035,909, Cl. 426-473.000.

Immunobiology Research Institute, Inc.: *See—*
Audhya, Tapan; and Goldstein, Gideon, 5,036,049, Cl. 514-17.000.
Audhya, Tapan; Venkatasubramanian, Krishnamurthy; and Goldstein, Gideon, 5,036,050, Cl. 514-17.000.

Imperial Chemical Industries PLC: *See—*
Bruneau, Pierre A. R., 5,036,083, Cl. 514-338.000.
Hart, Charles R., 5,035,945, Cl. 428-323.000.
Taylor, Stephen C., 5,036,009, Cl. 435-253.300.

Inaba, Fumiaki; and Inoue, Satoshi, to Terumo Kabushiki Kaisha. Vacuum blood sample collecting device. 5,035,865, Cl. 422-99.000.

Inaba, Shigemitsu: *See—*
Nakazato, Wataru; Muraoka, Kunihiko; Inaba, Shigemitsu; Ohtaka, Kazuto; and Takagishi, Takashi, 5,035,644, Cl. 439-372.000.

Inductotherm Corp.: *See—*
Fishman, Oleg, 5,036,181, Cl. 219-497.000.

Industrial Technology Research Institute: *See—*
Huang, Liang Y.; and Chen, San Y., 5,035,593, Cl. 425-85.000.

Infeld, Martin H.: *See—*
Bachynsky, Maria O.; Infeld, Martin H.; Margolis, Richard J.; and Perla, Dennis A., 5,036,102, Cl. 514-455.000.

Infrared Systems, Inc.: *See—*
Duran, Andrew J., 5,036,289, Cl. 328-117.000.

Inkwell (UK) Limited: *See—*
Wright, John G., 5,035,522, Cl. 400-197.000.

Inmos Limited: *See—*
Wise, Adrian P.; and Forsyth, Richard M., 5,036,494, Cl. 365-230.030.

Inokuchi, Toshiyuki, to Ricoh Company, Ltd. Optical imaging apparatus. 5,035,486, Cl. 350-167.000.

Inoue, Manabu; Taniguchi, Nobuyuki; Hata, Yoshiaki; Hoda, Takeo; Kudo, Yoshinobu; and Ueda, Hiroshi, to Minolta Camera Kabushiki Kaisha. Photographic camera. 5,036,344, Cl. 354-106.000.

Inoue, Satoshi: *See—*
Inaba, Fumiaki; and Inoue, Satoshi, 5,035,865, Cl. 422-99.000.

Inoue, Syuji: *See—*
Yasumoto, Yoshio; Kageyama, Sadashi; Inoue, Syuji; Abe, Yoshio; and Uwabata, Hideyo, 5,036,386, Cl. 358-12.000.

Inoue, Takesi: *See—*
Takahira, Kenichi; Yamaguchi, Atsuo; Furuta, Shigeru; Inoue, Takesi; Matsubara, Toshiyuki; and Fujioka, Shuzo, 5,036,460, Cl. 364-200.000.

Institut de Recherches de la Siderurgie Francaise: *See—*
Huin, Didier; and Riboud, Paul-Victor, 5,035,280, Cl. 164-463.000.

Institut Francais du Petrol: *See—*
Jarrin, Jacques; Robine, Magali; and Durand, Jean-Pierre, 5,035,822, Cl. 252-51.50R.

Institut Francais du Petrole: *See—*
Dang Vu, Quang; Huin, Roland; and Euzen, Jean-Paul, 5,035,867, Cl. 422-200.000.
Meynier, Patrick, 5,035,297, Cl. 181-106.000.

Institute Guilfoyle: *See—*
Seifert, Robert P., 5,035,348, Cl. 222-107.000.

Institute of Moelcular Biology, Inc.: *See—*
Antoniades, Harry N.; and Lynch, Samuel E., 5,035,887, Cl. 424-85.200.

Integrated Circuit Systems, Inc.: *See—*
Hohmann, Jere W.; Rogers, Bruce J.; Ransom, Stephen A.; and Clementi, Daniel M., 5,036,216, Cl. 309-269.000.

Intel Corporation: *See—*
Bazes, Mel, 5,036,230, Cl. 307-527.000.
Leonov, Mark A.; and Kordel, Jan A., 5,035,062, Cl. 33-533.000.
Mu, Xiao-Chun; and Multani, Jagir, 5,035,768, Cl. 156-626.000.
Saini, Avtar, 5,036,482, Cl. 364-760.000.

International Business Machines Corporation: *See—*
Bindra, Perminder; Covert, Kathleen L.; and Light, David N., 5,035,778, Cl. 204-94.000.
Busch, Robert E.; Hovis, William P.; Redman, Theodore M.; Thoma, Endre P.; and Yankosky, James A., 5,036,495, Cl. 365-233.000.
Downes, Robert W.; Smith, Wilson E.; Suciu, Ronald E.; and Wilson, Kenneth T., 5,036,514, Cl. 371-51.000.
Jaquette, Glen A., 5,036,218, Cl. 307-300.000.
Kuech, Thomas F.; and Tischler, Michael A., 5,036,022, Cl. 437-81.000.
Masleid, Robert P.; and Sechler, Robert F., 5,036,215, Cl. 307-243.000.
McCoy, Glenn C.; and Yiskis, Eric N., 5,036,484, Cl. 364-900.000.

International Flavors & Foods Ingredients Company, division of Indopco, Inc.: *See—*
Silva, Roy F., 5,035,903, Cl. 426-19.000.

International Superconductivity Technology Center: *See—*
Tanaka, Shoji; Yamauchi, Hisao; Yamada, Yukio; Ohnuki, Masayoshi; Morita, Etsuji; Toyoshima, Mitsunobu; Wada, Yasuo; Hinoshita, Hirotaka; Ikeda, Wataru; Aihara, Etsuji; Kobayashi, Tutomu; and Suguro, Kuniaki, 5,035,597, Cl. 425-135.000.

International Superconductor Corp.: *See—*
Hed, Aharon Z., 5,036,042, Cl. 505-1.000.

Interuniversitair Micro-Elektronica Centrum: *See—*
Groeseneken, Guido V. L.; and Maes, Herman E. M., 5,036,273, Cl. 324-158.00T.

Interuniversitair Micro-Elektronica Centrum vzw: *See—*
Vounckx, Roger A., 5,035,479, Cl. 350-96.140.

Inui, Masahiko. Polyp or cell block collecting instrument. 5,035,688, Cl. 604-190.000.

Irie, Nobuhiko: *See—*
Soeda, Koji; Kubota, Yoshiya; Okamoto, Shoji; Kubota, Akinori; Kobayashi, Michihito; Ijiri, Masaaki; Ozawa, Susumu; Tomosada, Kiyoshi; Irie, Nobuhiko; Hasegawa, Akira; Katayama, Hideaki; Murakami, Toshifumi; and Sakaguchi, Katsuyoshi, 5,035,591, Cl. 425-40.000.

Isenring, Hans P.; Zehnder, Beat; and Ziegler, Hugo, to Ciba-Geigy Corporation. Certain 2,4-dichloro-phenyl(loweralkylidene) pyridines having fungicidal activity. 5,036,074, Cl. 514-277.000.

Ishibashi, Youichi: *See—*
Morii, Takashi; and Ishibashi, Youichi, 5,036,394, Cl. 358-146.000.

Ishida, Noriya: *See—*
Suzuki, Kunio; Abe, Masayoshi; Kinka, Mikio; Arai, Yasuyuki; Satake, Akemi; Nishi, Kazuo; Kugawa, Shuichi; and Ishida, Noriya, 5,035,753, Cl. 136-249.000.

Ishiguro, Yoichi; Ooe, Masaharu; Kobayashi, Kohei; Tanaka, Gotaro; and Watanabe, Minoru, to Sumitomo Electric Industries, Ltd. Method and apparatus for producing coated optical fiber. 5,035,484, Cl. 350-96.300.

Ishihara Sangyo Kaisha Ltd.: *See—*
Nakajima, Tsunetaka; Okamoto, Tadao; Watanabe, Masahiro; and Yokoyama, Kazumasa, 5,036,072, Cl. 514-274.000.

Ishii, Kazuo: *See—*
Kato, Eiichi; and Ishii, Kazuo, 5,035,971, Cl. 430-114.000.

Ishii, Kunio: *See—*
Kanno, Nobumori; Ishii, Kunio; Takeda, Neiji; and Nihashi, Hiroyuki, 5,035,953, Cl. 428-484.000.

Ishii, Yoshio: *See—*
Nakamura, Yoshisada; Morigaki, Masakazu; Ishii, Yoshio; and Sakanoue, Kei, 5,035,988, Cl. 430-551.000.

Ishikawa, Akira; Ito, Yukio; Okamoto, Hiroshi; Kudo, Tetsuichi; and Miyauchi, Katsuki, to Hitachi, Ltd. Material for micro optical component and optical component using the same. 5,035,478, Cl. 350-96.120.

Ishikawa, Ken: *See—*
Iida, Yoshihiko; Ikeda, Mitsuru; Ishikawa, Ken; and Horiba, Isao, 5,036,545, Cl. 382-62.000.

Ishikawa, Masayuki: *See—*
Hatakoshi, Genichi; Itaya, Kazuhiko; Naritsuka, Shigeya; Ishikawa, Masayuki; Okuda, Hajime; Shiozawa, Hideo; Watanabe, Yukio; Ohba, Yasuo; Kokubun, Yoshihiro; and Uematsu, Yutaka, 5,036,521, Cl. 372-46.000.

Ishiyama, Tatsuro: *See—*
Takeguchi, Hajime; Tabata, Toshiyuki; and Ishiyama, Tatsuro, 5,035,407, Cl. 267-140.100.

Ishizuka, Hiroaki: *See—*
Sasaki, Takashi; Kasumi, Takafumi; Kubo, Naoya; Kainuma, Keiji; Wako, Katsuo; Ishizuka, Hiroaki; Kawaguchi, Gaku; and Oda, Tsunero, 5,036,011, Cl. 435-255.000.

Ishizuka, Koh; Nishimura, Tetsuharu; and Kasahara, Osamu, to Canon Kabushiki Kaisha. Rotary encoder using reflected light. 5,036,192, Cl. 250-231.160.

Islip, Peter J.: *See—*
Kneen, Geoffrey; Jackson, William P.; Islip, Peter J.; and Wates, Peter J., 5,036,157, Cl. 562-623.000.

Isover Saint-Gobain: *See—*
Kafka, Bernard, 5,035,080, Cl. 47-59.000.

Isozumi, Shuzoo, to Mitsubishi Denki Kabushiki Kaisha. Engine starter motor. 5,035,151, Cl. 74-7.00A.

Isozumi, Shuzoo, to Mitsubishi Denki Kabushiki Kaisha. Coaxial engine starter. 5,036,213, Cl. 290-48.000.

Issa, Khaled M.: *See—*
Hudson, Gregory L.; Issa, Khaled M.; Richards, Randall R.; and Sprick, William L., 5,035,212, Cl. 123-323.000.

Isuzu Motors Limited: *See—*
Shiratori, Naoki; Ueda, Yoshiaki; and Mitobe, Isami, 5,035,449, Cl. 292-48.000.

IT-McGill Pollution Control Systems, Inc.: *See—*
Johnson, Bruce C.; and Newburn, James A., 5,035,188, Cl. 110-345.000.

Itabashi, Tatsuo: *See—*
Nishioki, Nobuhisa; and Itabashi, Tatsuo, 5,035,507, Cl. 356-356.000.

Itaya, Kazuhiko: *See—*
Hatakoshi, Genichi; Itaya, Kazuhiko; Naritsuka, Shigeya; Ishikawa, Masayuki; Okuda, Hajime; Shiozawa, Hideo; Watanabe, Yukio; Ohba, Yasuo; Kokubun, Yoshihiro; and Uematsu, Yutaka, 5,036,521, Cl. 372-46.000.

Ito, Fumitaka: *See—*
Kitaura, Yoshihiko; Ito, Fumitaka; Stevens, Rodney W.; and Asai, Nobuko, 5,036,088, Cl. 514-375.000.

Ito, Masaya; and Taniguchi, Masato, to NGK Spark Plub Co., Ltd. Steel body having ceramic tip soldered thereto. 5,035,959, Cl. 428-627.000.

Ito, Masazumi: *See*—
Nishimori, Kadotaro; Ito, Masazumi; Higashio, Kimihiko; and Kato, Akio, 5,036,357, Cl. 355-202.000.
Ito, Takaaki: *See*—
Yoshimura, Toru; Uchida, Akio; Ito, Takaaki; and Saruwatari, Nobuya, 5,036,420, Cl. 361-118.000.
Ito, Takayuki, to Asahi Kogaku Kogyo Kabushiki Kaisha. Compact and high-speed wide-angle zoom lens system. 5,035,492, Cl. 350-423.000.
Ito, Yukio: *See*—
Ishikawa, Akira; Ito, Yukio; Okamoto, Hiroshi; Kudo, Tetsuichi; and Miyauchi, Katsuki, 5,035,478, Cl. 350-96.120.
Itoh, Noboru, to Mitsubishi Denki Kabushiki Kaisha. Mirror supporting device. 5,035,497, Cl. 350-611.000.
ITT Corporation: *See*—
Rudoy, Edward; and Lin, Michael A., 5,035,632, Cl. 439-108.000.
Wrench, Edwin H., Jr.; and Higgins, Alan L., 5,036,539, Cl. 381-43.000.
ITT Industries Limited: *See*—
Collier, John C.; and Reeves, Stuart J., 5,035,649, Cl. 439-607.000.
Van-Santbrink, Ronald; Collier, John C.; and Lee, David, 5,035,641, Cl. 439-329.000.
Iuliano, Joseph; and Gaines, Frederick W., Jr. Device for applying coatings to objects having irregular shapes and/or diverse surfaces. 5,035,022, Cl. 015-118.000.
Iwamasa, Akiyoshi: *See*—
Iida, Masaru; Iwamasa, Akiyoshi; and Tonomoto, Yoshihiro, 5,036,363, Cl. 355-246.000.
Iwamoto, Hirofumi: *See*—
Kawagishi, Hideyuki; Iwamoto, Hirofumi; Tsuboyama, Akira; and Mihara, Tadashi, 5,035,491, Cl. 350-350.00S.
Iwasaki, Takeshi; Yatomi, Takeshi; and Sakai, Akihiro, to Mitsubishi Denki Kabushiki Kaisha. Wire electrode supplying apparatus for wire electric discharge machine. 5,036,174, Cl. 219-69.120.
Iyer, S. Raja; and Trikha, Sudhir K., to Acme Resin Corporation. Ester hardeners for phenolic resin binder systems. 5,036,116, Cl. 523-145.000.
Izawa, Fumio: *See*—
Kobayashi, Hiromichi; and Izawa, Fumio, 5,035,633, Cl. 439-140.000.
Izawa, Kunisuke: *See*—
Majima, Eiji; Takino, Hiroski; Izawa, Kunisuke; Yokozeki, Kenzo; and Kubota, Koji, 5,036,004, Cl. 435-116.000.
Izumi, Masanori: *See*—
Baba, Fumiaki; Izumi, Masanori; Sawa, Kenji; and Kurumida, Susumu, 5,035,308, Cl. 192-0.052.
Izumita, Morishi: *See*—
Bergmans, Johannes W. M.; Mita, Seiichi; Izumita, Morishi; and Doi, Nobukazu, 5,036,524, Cl. 375-12.000.
J. H. Fenner & Co. Limited: *See*—
Seabrook, Colin; and Makin, David, 5,035,448, Cl. 285-94.000.
J. I. Case Company: *See*—
Dunn, Neil C.; McMillen, Richard E.; and Ricketts, Jon E., 5,035,675, Cl. 460-62.000.
J. M. Huber Corporation: *See*—
Wason, Satish K., 5,035,873, Cl. 423-328.000.
J. Paul Getty Trust, The: *See*—
Haak, Wayne R., 5,035,394, Cl. 298-562.000.
Jacks, Donald J.; Paniaqui, Clayton E.; Boss, Raymond E.; and Gaunt, Edwin, to United States of America, Navy. Thermosensitive pop-out device. 5,035,181, Cl. 102-481.000.
Jackson, Charles W.: *See*—
Chapin, John T.; Jackson, Charles W.; Mensah, Thomas O.; and Reynolds, Mickey R., 5,035,169, Cl. 89-1.340.
Jackson, Joseph M., to Crosspoint Systems, Inc. Twisted pair backplane. 5,036,160, Cl. 174-33.000.
Jackson, Melvin R.; Prugar, Mark L.; Yang, Swe-Wong; Rairden, John R., III; and Gigliotti, Michael F. X., Jr., to General Electric Company. Nickel-base superalloys especially useful as compatible protective environmental coatings for advanced superaloys. 5,035,958, Cl. 428-553.000.
Jackson, William P.: *See*—
Kneen, Geoffrey; Jackson, William P.; Islip, Peter J.; and Wates, Peter J., 5,036,157, Cl. 562-623.000.
Jacobs, Albert L.: *See*—
Witkin, Roy T., 5,035,883, Cl. 424-78.000.
Jaeggi, Knut A., to Ciba-Geigy Corporation. N-substituted aminoalkanediphosphonic acids. 5,036,058, Cl. 514-86.000.
Jager, Horst: *See*—
Kohlbauer, Johann; and Jager, Horst, 5,035,557, Cl. 409-233.000.
Jahn, Hans-Georg; Beisel, Hermann; and Seefried, Karl-Heinz, to Heidelberger Druckmaschinen AG. Washing device for cleaning a cylinder of a printing machine. 5,035,178, Cl. 101-425.000.
Jairam, Hari L., to Marconi Company Limited, The. Tapered slot antenna with balun slot line and stripline feed. 5,036,335, Cl. 343-767.000.
Jakubczak, Eugene R.: *See*—
Sasaki, Gordon H.; Jakubczak, Eugene R.; and Gauger, John R. D., 5,035,249, Cl. 128-899.000.
James, Keith: *See*—
Danilewicz, John C.; and James, Keith, 5,036,104, Cl. 514-513.000.
James River Corporation: *See*—
Kuchenbecker, Morris W., 5,035,330, Cl. 206-621.400.
Janik, Leon P., to Stanadyne Automotive Corp. Key system for filter assembly. 5,035,797, Cl. 210-232.000.
Janko, Michael; Moran, Ray; and Carlson, Norman, to APOC, Inc. Automatic inflator for inflatable articles. 5,035,345, Cl. 222-5.000.
Janome Sewing Machine Co. Ltd.: *See*—
Hanyu, Susumu, 5,035,193, Cl. 112-266.100.
Janssen, Johannes J. M., to U.S. Philips Corporation. DATV encoding and decoding method and apparatus. 5,036,392, Cl. 358-138.000.
Japan Aviation Electronics Industry Limited: *See*—
Endo, Hiroshi, 5,035,654, Cl. 439-679.000.
Japan Storage Battery Co., Ltd.: *See*—
Tokunaga, Akio; and Hayashi, Toshiaki, 5,035,966, Cl. 429-130.000.
Jaquette, Glen A., to International Business Machines Corporation. Antisaturation circuit. 5,036,218, Cl. 307-300.000.
Jarett, Keith: *See*—
Elliott, John C.; O'Connell, James A.; Ladouceur, Lawrence; Altman, William; and Jarett, Keith, 5,036,461, Cl. 364-408.000.
Jarreau, Francois X.; Rovei, Vincenzo; Koenig, Jean-Jacques; and Schoffs, Alain R., to Delalande S.A. 3-Aryloxazolidinone derivatives, process for their preparation and their use in therapy. 5,036,090, Cl. 514-376.000.
Jarreau, Francois X.; Rovei, Vincenzo; Koenig, Jean-Jacques; and Schoffs, Alain R., to Delalande S.A. 3-Aryloxazolidinone derivatives, process for their preparation and their use in therapy. 5,036,091, Cl. 514-376.000.
Jarrell, Bruce E.: *See*—
Alchas, Paul G.; Augello, Frank A.; Brooks, Christopher J.; Cutshall, Tony A.; DiPisa, Joseph A., Jr.; Williams, Stuart K.; Gabel, Jonathan B.; Mulhauser, Paul J.; Prais, Wes; Jarrell, Bruce E.; and Rose, Deborah G., 5,035,708, Cl. 623-1.000.
Jarrin, Jacques; Robine, Magali; and Durand, Jean-Pierre, to Institut Francais du Petrol. Copolymer compositions particularly useful as additives for hydrocarbon oils. 5,035,822, Cl. 252-51.50R.
Jeffers, John M.; Mundy, S. Wayne; and Knight, Stephen P., to General Instrument Corp. Geographic black-out method for direct broadcast satellite system. 5,036,537, Cl. 380-20.000.
Jemczyk, Iwan D.: *See*—
McNicol, John D.; and Jemczyk, Iwan D., 5,036,526, Cl. 375-39.000.
Jennejahn, Rosemary J.: *See*—
DeRosa, Thomas F.; Kaufman, Benjamin J.; and Jennejahn, Rosemary J., 5,035,819, Cl. 252-49.900.
Jenoptik Jena GmbH: *See*—
Schmidt, Jurgen; Furche, Thomas; Erdmann, Roland; Reichert, Marion; Bayer, Ullrich; Kurze, Peter; Schwarz, Thomas; Schreckenbach, Joachim; Kletke, Hans-Jurgen; Hoffmann, Andreas; Heppner, Martin; Hasse, Anja; Schmidt, Dorith; and Klaus, Annette, 5,035,781, Cl. 204-129.900.
Jensen, Russell R., to Westinghouse Electric Corp. Layered method of electrode for solid oxide electrochemical cells. 5,035,962, Cl. 429-40.000.
Jeruzal, Patricia M.: *See*—
Daniels, Thomas C.; Jeruzal, Patricia M.; and Bettle, Griscom, III, 5,035,323, Cl. 206-386.000.
Jewell, Jack L.: *See*—
Cloonan, Thomas J.; Jewell, Jack L.; McCormick, Frederick B., Jr.; Miller, David A. B.; and Prise, Michael E., 5,036,512, Cl. 370-2.000.
Jo, Sooin; and Yu, Jaiwhan, to Samsung Electronics Co., Ltd. Row address strobe signal input buffer for preventing latch-up. 5,036,227, Cl. 307-480.000.
Johansson, Karl N. G.; Kovacs, Zsuzsanna M. I.; Lindborg, Bjorn G.; and Stening, Goran B., to Medivir AB. Derivatives of purine. 5,036,071, Cl. 514-261.000.
Johansson, Sven-Åke: *See*—
Hansen, Bertil V.; Gunnarsson, Per-Olov G.; Mollberg, Henri R.; and Johansson, Sven-Åke, 5,036,062, Cl. 514-176.000.
John Brown, Inc.: *See*—
Perrigo, Michael C., 5,035,373, Cl. 242-56.00A.
John S. Seal, Jr., Revocable Trust, The: *See*—
Seal, John S., Jr., 5,035,174, Cl. 100-52.000.
Johns Hopkins University, The: *See*—
Civin, Curt I., 5,035,994, Cl. 435-2.000.
Johnson, Bruce C.; and Newburn, James A., to IT-McGill Pollution Control Systems, Inc. Liquid blowdown elimination system. 5,035,188, Cl. 110-345.000.
Johnson, Carl F., to Ford Motor Company. Resin transfer molding core and preform. 5,035,602, Cl. 425-468.000.
Johnson, Harlan B.: *See*—
Chakrabarti, Paritosh M.; Johnson, Harlan B.; Korach, Malcolm; Leatherman, Dennis D.; Reinhardt, Linda P.; and Simmons, Robert R., 5,035,886, Cl. 424-78.000.
Johnson, Howard B., to Consolidated Ceramic Products, Inc. Sprayable insulating liner compositions for metal vessels. 5,036,029, Cl. 501-121.000.
Johnson & Johnson Consumer Products, Inc.: *See*—
Martin, Patrick; and McMillan, Richard L., 5,035,612, Cl. 433-3.000.
Johnston, John E.: *See*—
Chung, David Y.; and Johnston, John E., 5,035,821, Cl. 252-51.50A.
Jonas, Friedrich; Heywang, Gerhard; Schmidtberg, Werner; Heinze, Jurgen; and Dietrich, Michael, to Bayer Aktiengesellschaft. Method of imparting antistatic properties to a substrate by coating the substrate with a novel polythiophene. 5,035,926, Cl. 427-393.100.
Jones, Gary V.: *See*—
Arora, Vijay K.; Jones, Gary V.; Kovtun, John M.; and Gabbard, Ronald G., 5,035,908, Cl. 426-388.000.

Jones, John D.; and McGinnis, Douglas S., to Canada, Her Majesty the Queen in right of, as represented by the Minister of Agriculture. Separation of oilseed components in solvent phase. 5,035,910, Cl. 426-478.000.

Jonischus, Jurgen, to Dupro AG. Adjustment mechanism for a friction drive unit. 5,035,154, Cl. 74-213.000.

Jonsen, Paul, to Datalight Limited. Portable NMR and NQR spectrometers. 5,036,279, Cl. 324-307.000.

Jorgensen, Paul J.: *See—*
Bartlett, Robert W.; Jorgensen, Paul J.; Allam, Ibrahim M.; and Rowcliffe, David J., 5,035,957, Cl. 428-552.000.

Joulin Aero Distribution S.A.R.L.: *See—*
Joulin, Michel, 5,035,568, Cl. 414-752.000.

Joulin, Michel, to Joulin Aero Distribution S.A.R.L. Suction gripper device and object transfer device. 5,035,568, Cl. 414-752.000.

Joyce, Nancy C.: *See—*
Neufeld, Arthur H.; Joyce, Nancy C.; and Jumblatt, Marcia M., 5,036,046, Cl. 514-12.000.

Juergens, Dieter C., to Deep South Crane & Rigging Co. Mobile crane with counterweight and auxiliary counterweight. 5,035,337, Cl. 212-196.000.

Jumblatt, Marcia M.: *See—*
Neufeld, Arthur H.; Joyce, Nancy C.; and Jumblatt, Marcia M., 5,036,046, Cl. 514-12.000.

Jungert, Horst A.; and Muller, Manfred H., to Texas Instruments Deutschland GmbH. Push-pull output stage of integrated circuit providing enhanced high-low voltage level signal transition with ground bounce control. 5,036,232, Cl. 307-542.000.

Junghans Uhren GmbH: *See—*
Ganter, Wolfgang, 5,036,500, Cl. 368-47.000.

Jungkunz, Clemens: *See—*
Weihrich, Georg; Wohld, Dietrich; Niemann, Martin; and Jungkunz, Clemens, 5,036,265, Cl. 318-618.000.

Juriga, James A.: *See—*
Walton, Erlen B.; Preston, David M.; Oliver, James L.; and Juriga, James A., 5,035,408, Cl. 267-265.000.

Kaaden, Jurgen; and Uhde, Dietmar, to Deutsche Thomson-Brandt GmbH. Signal selection arrangement. 5,036,409, Cl. 360-51.000.

Kabbara, Jamil. Device and method to check the tension of a suture during a surgical operation. 5,035,701, Cl. 606-148.000.

Kabushiki Kaisha Daimon: *See—*
Ebato, Sakae, 5,035,091, Cl. 52-1.000.

Kabushiki Kaisha Imao Kooporeishon: *See—*
Shimizu, Norihiko; Sato, Kanji; Saiki, Toru; Goto, Kunio; Matsubara, Masuo; and Wada, Hiroshi, 5,035,410, Cl. 269-136.000.

Kabushiki Kaisha Iseki: *See—*
Kawafuji, Takayuki; Akesaka, Toshio; and Ooka, Sinkiti, 5,035,539, Cl. 405-154.000.

Kabushiki Kaisha Ishikawa Seisakusho Ltd.: *See—*
Takeda, Junichi; and Yoshizuka, Haruo, 5,035,683, Cl. 493-23.000.

Kabushiki Kaisha Kobe Seiko Sho: *See—*
Tanaka, Katsumasa; Satoh, Hitoshi; Kawakami, Heijiro; and Marukawa, Nobuaki, 5,035,752, Cl. 134-32.000.

Kabushiki Kaisha Komatsu Seisakusho: *See—*
Asayama, Yoshio; Tsubota, Makio; Okura, Yasunori; and Sato, Takayuki, 5,035,312, Cl. 192-85.00R.
Harashima, Noboru; Mimura, Kazuhiro; Sasaki, Yosuke; Okubo, Hideaki; Nogawa, Makoto; and Fujimoto, Satoshi, 5,035,599, Cl. 425-150.000.
Yamaguchi, Yoshihiro; and Kuorkawa, Iwao, 5,036,176, Cl. 219-121.440.

Kabushiki Kaisha Little Rock: *See—*
Koiwa, Yoshinobu, 5,035,261, Cl. 137-516.110.

Kabushiki Kaisha Nagano Keiki Seisakusho: *See—*
Uchida, Akito; and Uehara, Daiji, 5,036,422, Cl. 361-159.000.

Kabushiki Kaisha Toshiba: *See—*
Ando, Hideo, 5,036,185, Cl. 250-201.500.
Hatakoshi, Genichi; Itaya, Kazuhiko; Naritsuka, Shigeya; Ishikawa, Masayuki; Okuda, Hajime; Shiozawa, Hideo; Watanabe, Yukio; Ohba, Yasuo; Kokubun, Yoshihiro; and Uematsu, Yutaka, 5,036,521, Cl. 372-46.000.
Kaga, Eiichi, 5,035,973, Cl. 430-125.000.
Kobayashi, Hiromichi; and Izawa, Fumio, 5,035,633, Cl. 439-140.000.
Mori, Seiichi, 5,036,383, Cl. 357-71.000.
Sakai, Hideo; Oikawa, Kiyoharu; and Saito, Tomotaka, 5,036,223, Cl. 307-448.000.
Umezawa, Toshimitsu, 5,036,387, Cl. 358-29.000.
Yamaguchi, Akira, 5,036,491, Cl. 365-189.070.

Kabushiki Kaisya Advance Kaihatsu Kenkyujo: *See—*
Aoki, Hideki; Akao, Masaru; and Shin, Yoshiharu, 5,035,711, Cl. 623-11.000.

Kafesjian, Ralph: *See—*
Wieting, David W.; Nguyen, Than; Stobie, Robert; Lam, Hung L.; and Kafesjian, Ralph, 5,035,709, Cl. 623-2.000.

Kafka, Bernard, to Isover Saint-Gobain. Element for above-ground cultivation. 5,035,080, Cl. 47-59.000.

Kaga, Eiichi, to Kabushiki Kaisha Toshiba. Image forming method and apparatus therefor. 5,035,973, Cl. 430-125.000.

Kagata, Hiroshi: *See—*
Yokotani, Yoichiro; Kagata, Hiroshi; Kato, Junichi; Nakatani, Seiichi; and Terada, Yukio, 5,036,424, Cl. 361-321.000.

Kageyama, Hitoshi, to Minolta Camera Kabushiki Kaisha. Interference filter with sharp cutoff characteristics. 5,035,485, Cl. 350-164.000.

Kageyama, Sadashi: *See—*
Yasumoto, Yoshio; Kageyama, Sadashi; Inoue, Syuji; Abe, Yoshio; and Uwabata, Hideyo, 5,036,386, Cl. 358-12.000.

Kagler, Edmond, Jr.: *See—*
Bailey, Thomas F.; Campbell, John E.; and Kagler, Edmond, Jr., 5,035,292, Cl. 175-45.000.

Kai, Yukio: *See—*
Watanabe, Tadahiko; Doutsu, Tsuyoshi; Shobu, Kazuhisa; and Kai, Yukio, 5,036,028, Cl. 501-96.000.

Kainuma, Keiji: *See—*
Sasaki, Takashi; Kasumi, Takafumi; Kubo, Naoya; Kainuma, Keiji; Wako, Katsuo; Ishizuka, Hiroaki; Kawaguchi, Gaku; and Oda, Tsunero, 5,036,011, Cl. 435-255.000.

Kajimura, Hiroshi; and Okada, Takao, to Olympus Optical Co., Ltd. Memory device with dual cantilever means. 5,036,490, Cl. 365-151.000.

Kako, Hajime, to Mitsubishi Denki K.K. Idling adjusting method. 5,035,217, Cl. 123-339.000.

Kali und Salz Aktiengesellschaft: *See—*
Loblich, Karl-Richard; and Lange, Susanne, 5,035,872, Cl. 423-306.000.

Kalinowski, Paul W.; Ramakrishnan, Muni S.; Rue, Charles V.; Sheldon, David A.; and Swanson, Brian E., to Norton Company. Bonded abrasive products containing sintered sol gel alumina abrasive filaments. 5,035,723, Cl. 51-309.000.

Kalman, Pinter, to Vegyimuveket Epito es Szerelo Vallalat. United liquid-level and pressure regulator for separators. 5,035,346, Cl. 222-68.000.

Kalnitsky, Alexander; Ellul, Joseph P.; and Boothroyd, Albert R., to Northern Telecom Limited. Optical waveguide and method for its manufacture. 5,035,916, Cl. 427-38.000.

Kaltenbronn, James S.; and Repine, Joseph T., to Warner-Lambert Company. Renin inhibitors containing alpha-heteroatom amino acids. 5,036,054, Cl. 514-19.000.

Kaltenbronn, James S.: *See—*
Himmelsbach, Richard; Hodges, John C.; Kaltenbronn, James S.; Patt, William C.; Repine, Joseph T.; and Sircar, Ila, 5,036,053, Cl. 514-19.000.

Kamada, Satoshi: *See—*
Iijima, Chiyoaki; Sato, Yuzuru; Wada, Hiroshi; Okumura, Osamu; and Kamada, Satoshi, 5,035,489, Cl. 350-335.000.

Kamahora, Fumio: *See—*
Fujita, Shigeru; Saito, Hideo; Yamamoto, Katsuyuki; Endo, Satoshi; and Kamahora, Fumio, 5,035,598, Cl. 425-144.000.

Kamai, Kenichiro: *See—*
Nishikawa, Seiichirou; and Kamai, Kenichiro, 5,035,226, Cl. 123-494.000.

Kamegai, Jun: *See—*
Takamura, Hiromi; Kamegai, Jun; and Hirota, Hajime, 5,035,832, Cl. 252-174.150.

Kamegai, Yuji: *See—*
Yamada, Tsutoo; Morizumi, Kenichi; Kamegai, Yuji; Kanno, Yasushi; and Shibuya, Takemi, 5,035,931, Cl. 428-35.700.

Kamei, Hideo: *See—*
Ohkuma, Hiroaki; Tomita, Koji; Konishi, Masataka; and Kamei, Hideo, 5,036,008, Cl. 435-252.100.
Ohnuma, Takeshi; Obata, Rika; Kamei, Hideo; and Naito, Takayuki, 5,036,055, Cl. 514-27.000.

Kamigaki, Tomoo; Tokunaga, Ichiro; Yanagita, Satoshi; and Hayasaka, Koro, to Alps Electric Co., Ltd. Magnetic recording medium for magnetic encoder. 5,035,960, Cl. 428-694.000.

Kamimura, Kuniaki; Sawada, Kenji; and Yamade, Yasushi, to Minolta Camera Kabushiki Kaisha. Microfilm projection apparatus having zoom lenses. 5,036,352, Cl. 355-45.000.

Kamitani, Toshiki, to Mitsubishi Denki Kabushiki Kaisha. Frequency synthesizer allowing rapid frequency switching. 5,036,295, Cl. 331-10.000.

Kammermaier, Johann; and Rittmayer, Gerhard, to Siemens Aktiengesellschaft. Method of preparing layers of vinylidene fluoride polymers and vinylidene fluoride/trifluoroethylene copolymers on a substrate. 5,035,917, Cl. 427-41.000.

Kan, Kojiro: *See—*
Yamasaki, Kazuyuki; Yamamoto, Kimio; Watanabe, Masanobu; Kan, Kojiro; and Nakayama, Yoshio, 5,035,802, Cl. 210-440.000.

Kanamaru, Hisanobu; and Asahi, Naotatsu, to Hitachi, Ltd.; and Hitachi Powdered Metals Co., Ltd. A universal power transmission joint having a pair of drive pins fixed in parallel by a tie member. 5,035,677, Cl. 464-138.000.

Kanashige, Masanori: *See—*
Fukuda, Toshio; and Kanashige, Masanori, 5,035,530, Cl. 403-404.000.

Kanbara, Minoru, to Casio Computer Co., Ltd. Sense amplifier circuit using then film transistors. 5,036,231, Cl. 307-530.000.

Kaneda, Hiroshi; and Ikebe, Masaru, to TDK Corporation. Disc cartridge having an improved shutter configuration. 5,036,421, Cl. 360-133.000.

Kaneda, Takashi; and Villwock, Thomas, to Mips Co., Ltd; and Dataline Technologies GmbH. IC card adapter. 5,036,429, Cl. 361-392.000.

Kanegaonkar, Rahul G., to Smiths Industries Public Limited Company. Filtration device for respiratory gasses with heat and moisture exchange. 5,035,236, Cl. 128-201.130.

Kaneko, Kyoichi, to Daiwa Seiko Inc. Drag device for fishing reels. 5,035,374, Cl. 242-264.000.

Kaneto Co., Ltd.: *See—*
Nojima, Norihiro, 5,035,367, Cl. 241-37.500.

Kang, Yung J., to Dae Kyo Limited. Blocks with platform, wheel and recesses. 5,035,666, Cl. 446-118.000.

Kanno, Nobumori; Ishii, Kunio; Takeda, Neiji; and Nihashi, Hiroyuki, to Toyo Ink Manufacturing Co., Ltd. Process for thermal transfer recording and heat-sensitive transfer material. 5,035,953, Cl. 428-484.000.

Kanno, Yasushi: *See*—
Yamada, Tsutoo; Morizumi, Kenichi; Kamegai, Yuji; Kanno, Yasushi; and Shibuya, Takemi, 5,035,931, Cl. 428-35.700.

Kansai Paint Company, Limited: *See*—
Tomiyama, Takeshi; Hashimoto, Sadaaki; and Murase, Heihachi, 5,035,934, Cl. 428-40.000.

Kanto, Jumpei J. K.; Saito, Hitoshi H. S.; Eguchi, Hiroshi H. E.; and Nakamura, Masayuki M. N., to Dai Nippon Insatsu Kabushiki Kaisha. Heat transfer sheet. 5,036,041, Cl. 503-227.000.

Kanzaki Paper Manufacturing Co., Ltd.: *See*—
Yonese, Naoki; Nakamura, Mikio; Kawamura, Masato; and Takayama, Yukio, 5,035,954, Cl. 428-500.000.

Kao Corporation: *See*—
Asahi, Masahiko; Shirakawa, Noriko; and Kikuta, Yuko, 5,036,108, Cl. 514-937.000.
Takamura, Hiromi; Kamegai, Jun; and Hirota, Hajime, 5,035,832, Cl. 252-174.150.

Kapeller, Manfred: *See*—
Leuchtenmuller, Rudolf; Kapeller, Manfred; and Schofberger, Johann, 5,035,033, Cl. 28-115.000.

Kaplan, Murray A.: *See*—
Lam, King S.; Mattei, Jacqueline; Leet, John E.; Matson, James A.; Tomita, Koji; and Kaplan, Murray A., 5,036,010, Cl. 435-253.500.

Kapoor, John N.: *See*—
Alam, Abu S.; Sayeed, Fakrul A. A.; Koziol, Kenneth J.; and Kapoor, John N., 5,036,060, Cl. 514-110.000.

Karetsos, Anastasios; and Zwilling, Gerhard, to Siemens Aktiengesellschaft. CMOS-RAM memory in a gate array arrangement. 5,036,487, Cl. 365-51.000.

Kariya, Kohichi: *See*—
Matsushima, Osamu; Maehashi, Yukio; Katori, Shigetatsu; Nomura, Masahiro; Shinohara, Hiroko; Kariya, Kohichi; and Abe, Mitsue, 5,036,458, Cl. 364-200.000.

Kasahara, Osamu: *See*—
Ishizuka, Koh; Nishimura, Tetsuharu; and Kasahara, Osamu, 5,036,192, Cl. 250-231.160.

Kasai, Norio, to Toshiba Lighting & Technology Corporation. Board for hybrid integrated circuit. 5,036,167, Cl. 174-256.000.

Kaseff, Charles A.: *See*—
Tonnu, Thao T.; Suthar, Mukesh B.; and Kaseff, Charles A., 5,036,226, Cl. 307-475.000.

Kashima, Shoichi: *See*—
Oya, Junichi; and Kashima, Shoichi, 5,035,284, Cl. 165-146.000.

Kashiwagi, Hiroshi: *See*—
Tamura, Koji; Kashiwagi, Hiroshi; and Noguchi, Masahiro, 5,035,823, Cl. 252-67.000.

Kasprzyk, Daniel J.; Orth, Jean C.; and Gaiser, John W., to Advanced Cardiovascular Systems, Inc. Dilatation catheter assembly with heated balloon. 5,035,694, Cl. 606-27.000.

Kast, Michael A.: *See*—
Weber, Jaroy, Jr.; Kloeckl, Terrance L.; Kast, Michael A.; and Watkins, Frank T., III, 5,035,695, Cl. 606-42.000.

Kasumi, Takafumi: *See*—
Sasaki, Takashi; Kasumi, Takafumi; Kubo, Naoya; Kainuma, Keiji; Wako, Katsuo; Ishizuka, Hiroaki; Kawaguchi, Gaku; and Oda, Tsunero, 5,036,011, Cl. 435-255.000.

Katane, Mamoru: *See*—
Sonobe, Tadasi; Katane, Mamoru; Ikeguchi, Takashi; Matsumoto, Manabu; Ueda, Shinjiro; Kobari, Toshiaki; Takahashi, Takao; Hayasaka, Toa; and Kitayama, Toyoki, 5,036,290, Cl. 328-235.000.

Kataoka, Toyotaka; and Sakamoto, Kiichi, to Fujitsu Limited. Fabrication method for semiconductor devices and transparent mask for charged particle beam. 5,036,209, Cl. 250-492.200.

Katayama, Hideaki: *See*—
Soeda, Koji; Kubota, Yoshiya; Okamoto, Shoji; Kubota, Akinori; Kobayashi, Michihito; Ijiri, Masaaki; Ozawa, Susumu; Tomosada, Kiyoshi; Irie, Nobuhiko; Hasegawa, Akira; Katayama, Hideaki; Murakami, Toshifumi; and Sakaguchi, Katsuyoshi, 5,035,591, Cl. 425-40.000.

Katayama, Hironobu: *See*—
Shiraishi, Kenichi; Uejima, Takamasa; and Katayama, Hironobu, 5,036,412, Cl. 360-85.000.

Kato, Akio: *See*—
Nishimori, Kadotaro; Ito, Masazumi; Higashio, Kimihiko; and Kato, Akio, 5,036,357, Cl. 355-202.000.

Kato, Eiichi; and Ishii, Kazuo, to Fuji Photo Film Co., Ltd. Electrostatic photographic liquid developer. 5,035,971, Cl. 430-114.000.

Kato, Hiroaki: *See*—
Miyago, Makoto; Oka, Hiroshi; Imaya, Akihiko; Kato, Hiroaki; Nagayasu, Takayoshi; and Hirobe, Toshihiko, 5,036,370, Cl. 357-4.000.

Kato, Junichi: *See*—
Yokotani, Yoichiro; Kagata, Hiroshi; Kato, Junichi; Nakatani, Seiichi; and Terada, Yukio, 5,036,424, Cl. 361-321.000.

Kato, Kanji: *See*—
Noguchi, Kouki; Akizawa, Mitsuru; and Kato, Kanji, 5,036,486, Cl. 365-49.000.

Kato, Kinya: *See*—
Hatamori, Osamu; Hata, Yoshiaki; Sumitani, Atsushi; Kobayashi, Haruo; and Kato, Kinya, 5,036,346, Cl. 354-195.120.

Kato, Mitsumi, to Yamaha Corporation. Modulation effect device. 5,036,541, Cl. 381-62.000.

Kato, Yuichi; Yoshida, Hiroshi; and Mizusawa, Kozo, to Ohi Seisakusho Co., Ltd. Roof door device of motor vehicle. 5,035,463, Cl. 296-223.000.

Katoh, Akira: *See*—
Ichikawa, Yasunori; Ohnishi, Hiroshi; Urabe, Shigeharu; Kojima, Akira; and Katoh, Akira, 5,035,991, Cl. 430-569.000.

Katori, Shigetatsu: *See*—
Matsushima, Osamu; Maehashi, Yukio; Katori, Shigetatsu; Nomura, Masahiro; Shinohara, Hiroko; Kariya, Kohichi; and Abe, Mitsue, 5,036,458, Cl. 364-200.000.

Katsaros, Mark G.: *See*—
Zimmel, John M.; Katsaros, Mark G.; and Bunnelle, William L., 5,035,691, Cl. 604-361.000.

Katsuki, Masahide; and Shoji, Tsuneo, to Toshiba Kikai Kabushiki Kaisha. Cylindrical grinding machine suitable for use on the rolls of a rolling mill or the like. 5,035,086, Cl. 51-49.000.

Katsuno, Toshiyasu; Iguchi, Satoshi; and Chujo, Yoshiki, to Toyota Jidosha Kabushiki Kaisha. Fuel injector for use in an engine. 5,035,358, Cl. 239-403.000.

Katsushima, Takeo: *See*—
Taguchi, Hiroaki; Katsushima, Takeo; Ban, Masakazu; Takahashi, Mitsuru; Shinoda, Kiyotaka; and Watanabe, Akihiko, 5,036,086, Cl. 514-367.000.

Katz, Avishay: *See*—
Dautremont-Smith, William C.; Katz, Avishay; Koszi, Louis A.; Segner, Bryan P.; and Thomas, Peter M., 5,036,023, Cl. 437-184.000.

Katz, Larry; Maillefer, Michel; and Maillefer, Pierre-Luc, to Les Fils d'Auguste Maillefer, Societe Anonyme a Ballaigues. Instrument for the treatment of dental root-canals. 5,035,618, Cl. 433-102.000.

Kaufhold, Horst T.; and Altherr, Russell G., to AMSTED Industries Incorporated. Slackless railcar connections with extractable wedge. 5,035,338, Cl. 213-50.000.

Kaufman, Benjamin J.: *See*—
DeRosa, Thomas F.; Kaufman, Benjamin J.; and Jennejahn, Rosemary J., 5,035,819, Cl. 252-49.900.
Sung, Rodney L.; and Kaufman, Benjamin J., 5,035,719, Cl. 44-334.000.

Kaufman, Jack W.: *See*—
Brown, James; and Kaufman, Jack W., 5,035,468, Cl. 300-21.000.

Kaufman, Stephen B.; DiGianfilippo, Aleandro; Sager, Tamara L.; and Meyer, Alan R., to Healthtech Services Corp. Interactive patient assistance and medication delivery systems responsive to the physical environment of the patient. 5,036,462, Cl. 364-413.010.

Kavaliunas, Arunas V., to Eastman Kodak Company. Dichloromethane abatement. 5,035,809, Cl. 210-728.000.

Kawabata, Yasukazu; Hamaguchi, Susumu; Takahashi, Toshio; Yokota, Hiroshi; and Shibayama, Katsutoshi. Acceleration accumulating conveyor chain. 5,035,318, Cl. 198-779.000.

Kawabe, Shigetoshi: *See*—
Koyama, Noboru; Nakano, Yasushi; Yasufuku, Yoshitaka; Kawahara, Setsuko; Namiki, Takemasa; Kawabe, Shigetoshi; and Umemura, Masahiro, 5,035,856, Cl. 428-328.000.

Kawabuchi, Masami: *See*—
Nakamura, Yasuhiro; Sakai, Ikuo; and Kawabuchi, Masami, 5,035,245, Cl. 128-661.090.

Kawafuji, Takayuki; Akesaka, Toshio; and Ooka, Sinkiti, to Toa Grout Kogyo Kabushiki Kaishi; and Kabushiki Kaisha Iseki. Liner for pipeline repair and method for repairing pipelines. 5,035,539, Cl. 405-154.000.

Kawagishi, Hideyuki; Iwamoto, Hirofumi; Tsuboyama, Akira; and Mihara, Tadashi, to Canon Kabushiki Kaisha. Liquid crystal apparatus. 5,035,491, Cl. 350-350.00S.

Kawaguchi, Gaku: *See*—
Sasaki, Takashi; Kasumi, Takafumi; Kubo, Naoya; Kainuma, Keiji; Wako, Katsuo; Ishizuka, Hiroaki; Kawaguchi, Gaku; and Oda, Tsunero, 5,036,011, Cl. 435-255.000.

Kawaguchi, Shogo: *See*—
Toyoda, Shuhei; Mase, Syunzo; Matsuura, Masami; and Kawaguchi, Shogo, 5,035,495, Cl. 350-588.000.

Kawahara, Setsuko: *See*—
Koyama, Noboru; Nakano, Yasushi; Yasufuku, Yoshitaka; Kawahara, Setsuko; Namiki, Takemasa; Kawabe, Shigetoshi; and Umemura, Masahiro, 5,035,856, Cl. 428-328.000.

Kawai, Yoshinori: *See*—
Tokuda, Shuichirou; Furukawa, Noriyuki; and Kawai, Yoshinori, 5,036,435, Cl. 362-31.000.

Kawaike, Kazuhiko: *See*—
Aizawa, Kooji; Nii, Katsutoshi; Kawaike, Kazuhiko; Hasegawa, Kengo; Saruta, Akira; and Nakashima, Ryoichi, 5,035,519, Cl. 384-121.000.

Kawakami, Heijiro: *See*—
Tanaka, Katsumasa; Satoh, Hitoshi; Kawakami, Heijiro; and Marukawa, Nobuaki, 5,035,752, Cl. 134-32.000.

Kawakami, James H.; Harris, James E.; Maresca, Louis M.; and Robeson, Lloyd M., to Amoco Corporation. Polyarylates having improved hydrolytic stability. 5,036,150, Cl. 528-173.000.

Kawamoto Optical Industrial Company Limited: *See*—
Kitamura, Kanji; and Kawamoto, Shuichi, 5,035,499, Cl. 351-153.000.

Kawamoto, Shuichi: *See*—
Kitamura, Kanji; and Kawamoto, Shuichi, 5,035,499, Cl. 351-153.000.
Kawamura, Masato: *See*—
Yonese, Naoki; Nakamura, Mikio; Kawamura, Masato; and Takayama, Yukio, 5,035,954, Cl. 428-500.000.
Kawamura, Takahiro: *See*—
Baba, Shigeo; Shibata, Yukio; Kawamura, Takahiro; Takaoka, Hideo; Kimura, Tsuguo; Kousaka, Kazuo; Minato, Yoshihiro; Yokoyama, Naruo; Iida, Kozo; and Imai, Tetsuya, 5,036,035, Cl. 502-221.000.
Kawamura, Toshio: *See*—
Sugino, Takao; Kawamura, Toshio; Asai, Masamichi; Yamada, Hiroshi; Mukoyama, Kenichi; Takahashi, Akira; and Hikima, Hiroshi, 5,035,919, Cl. 427-140.000.
Kawano, Kiyoshi, to Asahi Kogaku Kogyo Kabushiki Kaisha. Camera provided with a strobe. 5,036,345, Cl. 354-126.000.
Kawarai, Seigi; Kuse, Sadamu; and Orita, Yasushi, to Hitachi Maxell, Ltd. Magnetic recording medium including magnetic metallic powder. 5,035,947, Cl. 428-329.000.
Kawasaki, Masahiro: *See*—
Suzuki, Noboru; Toji, Shigeo; and Kawasaki, Masahiro, 5,036,349, Cl. 354-402.000.
Kawase, Ritsuo, to NOK Corporation. Device for sealing refueling opening. 5,035,272, Cl. 141-312.000.
Kawashima, Ichirou: *See*—
Yamada, Keiko; Suda, Mitsunobu; Kawashima, Ichirou; and Kitagawa, Nobuhiro, 5,035,413, Cl. 271-9.000.
Kawashima, Shunji: *See*—
Shiraki, Manabu; Miyao, Osami; Fujisawa, Shoji; and Kawashima, Shunji, 5,036,319, Cl. 341-115.000.
Kawashima, Takeshi: *See*—
Nishio, Hiroaki; and Kawashima, Takeshi, 5,035,847, Cl. 264-86.000.
Kawashita, Hiroichi; and Komatsu, Yasunori, to Honda Giken Kogyo Kabushiki Kaisha. Heat exchanger made of aluminum and surface treating method therefor. 5,035,282, Cl. 165-133.000.
KCL Corporation: *See*—
Edelman, Paul F., 5,035,517, Cl. 383-61.000.
Kehoe, Brian D.; and Matchett, Noel D. Audio surveillance discouragement apparatus and method. 5,036,542, Cl. 381-73.100.
Keitoku, Noboru, to Pioneer Electronic Corporation. Remote-control-light detecting device for AV apparatus. 5,036,188, Cl. 250-216.000.
Kelbin Co., Ltd.: *See*—
Koiwa, Yoshinobu, 5,035,261, Cl. 137-516.110.
Kelleher, John J., Jr.; and Shute, Donald W., to Raytheon Company. Spike limiting circuit. 5,036,450, Cl. 363-26.000.
Kelly, Stephen L.: *See*—
Beaver, Richard N.; Byrd, Carl E.; and Kelly, Stephen L., 5,035,789, Cl. 204-290.00R.
Kemplin, Steven C., to Honeywell Inc. Method and apparatus for high speed linear shading in a raster graphics system. 5,036,316, Cl. 340-728.000.
Kenna, Robert V., to Pfizer Hospital Products Group, Inc. Prosthetic knee joint with improved patellar component tracking. 5,035,700, Cl. 606-88.000.
Kerrigan, James E.; and McMenamin, John E., to Duo-Fast Corporation. Hog ring fastener, tool and methods. 5,035,040, Cl. 29-505.000.
Kesper, Heinrich. Chain guide for power chain saws. 5,035,057, Cl. 30-383.000.
Keswick Lake Pty. Ltd.: *See*—
Towns, Robert C., 5,035,084, Cl. 49-381.000.
Key-Tech, Inc.: *See*—
Durand, David, 5,036,128, Cl. 524-440.000.
Khan, Abdul F.: *See*—
Smrt, Thomas J.; and Khan, Abdul F., 5,035,920, Cl. 427-202.000.
Khan, Aurangzeb K.: *See*—
Le, Duc N.; Yue, Lordson L.; Costantino, Cirillo L.; Chengson, David P.; and Khan, Aurangzeb K., 5,036,528, Cl. 375-119.000.
Khan, Gul N.: *See*—
Gillies, Duncan F.; Khan, Gul N.; and Takahashi, Yutaka, 5,036,464, Cl. 364-413.130.
Khaund, Arup K.: *See*—
Pukari, Vimal K.; Paille, Norman I., Jr.; Thibaudeau, Thomas P.; and Khaund, Arup K., 5,035,724, Cl. 51-309.000.
Kidokoro, Naoto: *See*—
Kiyonari, Toshiyuki; Hirabayashi, Satoshi; and Kidokoro, Naoto, 5,035,983, Cl. 430-346.000.
Kieke, Dan E.; and Naae, Douglas G., to Texaco Inc. Lignin phenol/-lignin/amine surfactant system. 5,035,288, Cl. 166-274.000.
Kikuchi, Atsushi; and Tatsuo, Yoshiyuki, to Matsushita Electric Works, Ltd. Multi-unit switch assembly. 5,036,168, Cl. 200-5.00R.
Kikuchi, Katsuji: *See*—
Mori, Tamotsu; and Kikuchi, Katsuji, 5,035,016, Cl. 5-453.000.
Kikukawa, Norio: *See*—
Horita, Yoshiyuki; Nakayama, Kiyoshi; Sugimoto, Yasuhiko; Kikukawa, Norio; Yamaguchi, Yoshiharu; and Funakawa, Shigeru, 5,035,029, Cl. 24-394.000.
Kikuta, Yuko: *See*—
Asahi, Masahiko; Shirakawa, Noriko; and Kikuta, Yuko, 5,036,108, Cl. 514-937.000.
Kilpatrick, Jerry B.; and Lincoln, Clifford F., to AMP Incorporated. Hermaphroditic electrical connector. 5,035,639, Cl. 439-290.000.
Kim, Byung J.: *See*—
Kim, Eung S.; Kim, Byung J.; and Ahn, Seong J., 5,036,171, Cl. 219-10.55D.
Kim, Eung S.; Kim, Byung J.; and Ahn, Seong J., to Goldstar Co., Ltd. Electromagnetic wave energy seal arrangement. 5,036,171, Cl. 219-10.55D.
Kim, Jin-Ki: *See*—
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Burow, Wilfried; Kischkewitz, Jurgen; and Schlak, Ottfried, 5,035,748, Cl. 106-499.000.
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Kiss, Akos: *See*—
Speer, Dietrich; Kiss, Akos; and Kleinschmit, Peter, 5,035,746, Cl. 106-438.000.
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Yada, Masami; Funamoto, Takao; Kitamura, Michio; Komatsu, Junzo; Midorikawa, Masakazu; and Yoshikawa, Tsugio, 5,035,579, Cl. 416-241.00R.
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Kladnig, Wolfgang; and Krivanec, Heinz, to Maschinenfabrik Andritz Aktiengesellschaft. Process of making catalysts and catalysts made by the process. 5,036,037, Cl. 502-319.000.
Klarer, Martin: *See*—
Leiber, Heinz; Schneider, Werner; Waxenberger, Erich; Klarer, Martin; Zimmer, Richard; and Burckhardt, Manfred, 5,035,295, Cl. 180-140.000.
Klaus, Annette: *See*—
Schmidt, Jurgen; Furche, Thomas; Erdmann, Roland; Reichert, Marion; Bayer, Ulrich; Kurze, Peter; Schwarz, Thomas;

Schreckenbach, Joachim; Kletke, Hans-Jurgen; Hoffmann, Andreas; Heppner, Martin; Hasse, Anja; Schmidt, Dorith; and Klaus, Annette, 5,035,781, Cl. 204-129.900.

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Heinemann, Ulrich; Kleefeld, Gerd; Dutzmann, Stefan; and Hanssler, Gerd, 5,036,085, Cl. 514-361.000.

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Speer, Dietrich; Kiss, Akos; and Kleinschmit, Peter, 5,035,746, Cl. 106-438.000.

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Amico, Russell P.; and Klier, George M., 5,035,264, Cl. 137-625.650.

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Weber, Jaroy, Jr.; Kloeckl, Terrance L.; Kast, Michael A.; and Watkins, Frank T., III, 5,035,695, Cl. 606-42.000.

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Knapp, Jeffrey P., to University of Massachusetts. Low energy extractive distillation process for producing anhydrous ethanol. 5,035,776, Cl. 203-19.000.

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Norman, Marvin N.; Smith, Lawrence E.; and Knight, Peter R., 5,036,257, Cl. 315-381.000.

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Jeffers, John M.; Mundy, S. Wayne; and Knight, Stephen P., 5,036,537, Cl. 380-20.000.

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Kobayashi, Kohei: *See*—
Ishiguro, Yoichi; Ooe, Masaharu; Kobayashi, Kohei; Tanaka, Gotaro; and Watanabe, Minoru, 5,035,484, Cl. 350-96.300.

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Soeda, Koji; Kubota, Yoshiya; Okamoto, Shoji; Kubota, Akinori; Kobayashi, Michihito; Ijiri, Masaaki; Ozawa, Susumu; Tomosada, Kiyoshi; Irie, Nobuhiko; Hasegawa, Akira; Katayama, Hideaki; Murakami, Toshifumi; and Sakaguchi, Katsuyoshi, 5,035,591, Cl. 425-40.000.

Kobayashi, Naoaki: *See*—
Nagashima, Makoto; Kobayashi, Naoaki; and Wong, Jerry, 5,035,751, Cl. 134-22.100.

Kobayashi, Nobuo: *See*—
Yamada, Minoru; and Kobayashi, Nobuo, 5,035,359, Cl. 239-502.000.

Kobayashi, Tatsuhiko: *See*—
Shioya, Nobuyuki; Kuroyanagi, Yoshimitsu; Kounami, Yasuo; and Kobayashi, Tatsuhiko, 5,035,893, Cl. 424-447.000.

Kobayashi, Tutomu: *See*—
Tanaka, Shoji; Yamauchi, Hisao; Yamada, Yukio; Ohnuki, Masayoshi; Morita, Etsuji; Toyoshima, Mitsunobu; Wada, Yasuo; Hinoshita, Hirotaka; Ikeda, Wataru; Aihara, Etsuji; Kobayashi, Tutomu; and Suguro, Kuniaki, 5,035,597, Cl. 425-135.000.

Koch, Horst: *See*—
Kurtz, Karl-Rudolf; Koch, Horst; Telser, Thomas; and Bach, Helmut, 5,035,981, Cl. 430-327.000.

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Willert, Hans-Georg; Koch, Rudolf; and Burgi, Maxa, 5,035,714, Cl. 623-16.000.

Kochi, Matsuyuki. Method of treating cancer cells in humans. 5,036,103, Cl. 514-467.000.

Koegel, Robert J., to Honeywell Information Systems Inc. Apparatus for controlling concurrent operations of a system control unit including activity register circuitry. 5,036,456, Cl. 364-200.000.

Koelling, Robert K., Sr., to Morgan Construction Company. Split yoke universal joint. 5,035,676, Cl. 464-135.000.

Koenig, Jean-Jacques: *See*—
Jarreau, Francois X.; Rovei, Vincenzo; Koenig, Jean-Jacques; and Schoffs, Alain R., 5,036,090, Cl. 514-376.000.
Jarreau, Francois X.; Rovei, Vincenzo; Koenig, Jean-Jacques; and Schoffs, Alain R., 5,036,091, Cl. 514-376.000.

Koester, Eric J. Cap and mask organization. 5,035,004, Cl. 2-206.000.

Kogen, Robert A. Earring cushion and method of making same. 5,035,123, Cl. 63-14.300.

Kogo, Akemi: *See*—
Mine, Katsutoshi; Kogo, Akemi; Yamakawa, Kimio; and Nakayoshi, Kazumi, 5,036,024, Cl. 437-211.000.

Kohlbauer, Johann; and Jager, Horst, to Hertel AG Werkzeuge & Hartstoffe. Chuck for axially clamping a tool to a machine tool spindle. 5,035,557, Cl. 409-233.000.

Kohno, Yoshiaki: *See*—
Omori, Nagato; Sano, Harunobu; Kohno, Yoshiaki; and Sakabe, Yukio, 5,036,425, Cl. 361-321.000.

Koiwa, Mitsuru, to Mitsubishi Denki Kabushiki Kaisha. Ignition device for an internal combustion engine. 5,035,229, Cl. 123-626.000.

Koiwa, Yoshinobu, to Koiwa, Yoshinobu; Kabushiki Kaisha Little Rock; Kelbin Co., Ltd.; and Fujimori, Shuichi. Pump and valve apparatus. 5,035,261, Cl. 137-516.110.

Kojima, Akira: *See*—
Ichikawa, Yasunori; Ohnishi, Hiroshi; Urabe, Shigeharu; Kojima, Akira; and Katoh, Akira, 5,035,991, Cl. 430-569.000.

Kojima Chemicals Co., Ltd.: *See*—
Nishiyama, Koji; Yamazaki, Masayuki; Tsukuda, Takeshi; and Arai, Youtaro, 5,035,744, Cl. 106-1.230.

Kojima, Toshihiro, to Canon Kabushiki Kaisha. Image amending method. 5,036,405, Cl. 358-448.000.

Kojima, Yasushi: *See*—
Nakamura, Takashi; and Kojima, Yasushi, 5,036,207, Cl. 250-484.100.

Kokkeler, Franciscus; Idebro, Mats; Cigarini, Enzo; and Fioroli, Mario, to Whirlpool International B.V. Method and device for determining when a food has thawed in a microwave oven. 5,036,172, Cl. 219-10.55M.

Kokubun, Yoshihiro: *See*—
Hatakoshi, Genichi; Itaya, Kazuhiko; Naritsuka, Shigeya; Ishikawa, Masayuki; Okuda, Hajime; Shiozawa, Hideo; Watanabe, Yukio; Ohba, Yasuo; Kokubun, Yoshihiro; and Uematsu, Yutaka, 5,036,521, Cl. 372-46.000.

Kolgin, ALexandr P.: *See*—
Arabei, Boris G.; Kostyrev, Sergei B.; Mints, Alexandr S.; Pronin, Lev A.; Ryzhonkov, Dmitry I.; Sopochkin, Sergei A.; Stepnov, Sergei A.; Esikman, Vladimir L.; Vasiliev, Andrei V.; and Kolgin, ALexandr P., 5,036,170, Cl. 219-10.410.

Kolsky, Rodger E., to HPI Health Protection, Inc. Protective device for reducing injury from falls. 5,034,998, Cl. 2-2.000.

Kolwert, Alois: *See*—
Obrecht, Werner; Szentivanyi, Szolt; Sutter, Hubert; Herwig, Jens; and Kolwert, Alois, 5,036,149, Cl. 526-323.200.

Komata, Hiroyuki: *See*—
Watanabe, Tomomi; and Komata, Hiroyuki, 5,036,247, Cl. 313-496.000.

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Yada, Masami; Funamoto, Takao; Kitamura, Michio; Komatsu, Junzo; Midorikawa, Masakazu; and Yoshikawa, Tsugio, 5,035,579, Cl. 416-241.00R.

Komatsu, Yasunori: *See*—
Kawashita, Hiroichi; and Komatsu, Yasunori, 5,035,282, Cl. 165-133.000.

Komuro, Mitsuo, to Nippon Athletic Industry Company. Magnetic sleeping mat. 5,035,017, Cl. 5-481.000.

Kondo, Kazuhiko: *See*—
Tamura, Yutaka; Hosokawa, Yoshio; Noro, Satoshi; and Kondo, Kazuhiko, 5,036,471, Cl. 364-449.000.

Kondo, Syunichi; Yokoya, Hiroaki; and Horie, Seiji, to Fuji Photo Film Co., Ltd. Electrophotographic photoreceptor containing phthalocyanine. 5,035,969, Cl. 430-83.000.

Kondo, Yasuaki: *See*—
Kurono, Masayasu; Usui, Toshinao; Miura, Kenji; Kondo, Yasuaki; and Sawai, Kiichi, 5,036,080, Cl. 514-333.000.

Konica Corporation: *See*—
Haneda, Satoshi; Shoji, Hisashi; and Yoshino, Kunihisa, 5,036,367, Cl. 355-260.000.
Koyama, Noboru; Nakano, Yasushi; Yasufuku, Yoshitaka; Kawahara, Setsuko; Namiki, Takemasa; Kawabe, Shigetoshi; and Umemura, Masahiro, 5,035,856, Cl. 428-328.000.

Konishi, Kazuki: *See*—
Tsunekawa, Tokuichi; Nagano, Akihiko; and Konishi, Kazuki, 5,036,347, Cl. 354-400.000.

Konishi, Masataka: *See*—
Ohkuma, Hiroaki; Tomita, Koji; Konishi, Masataka; and Kamei, Hideo, 5,036,008, Cl. 435-252.100.

Konose, Yoshiomi, to Mitsubishi Pencil Co., Ltd. Liquid applicator. 5,035,525, Cl. 401-278.000.

Kontron Instruments Holdings, N.V.: *See*—
Tompkins, David J., 5,035,150, Cl. 73-864.150.

Kooijmans, Kees R.: *See*—
Kleingeld, Adriaan; Kooijmans, Kees R.; and Kragtwijk, Wilhelmus F., 5,035,860, Cl. 422-61.000.

Koolstra, Robert B.: *See*—
Goethals, Eric; Halkes, Sebastianus J.; and Koolstra, Robert B., 5,035,783, Cl. 204-157.670.

Kopach, Robert J., to E-Z Strainer, Inc. Flexible strainer with a releasable cord. 5,035,800, Cl. 210-469.000.

Korach, Malcolm: *See*—
Chakrabarti, Paritosh M.; Johnson, Harlan B.; Korach, Malcolm; Leatherman, Dennis D.; Reinhardt, Linda P.; and Simmons, Robert R., 5,035,886, Cl. 424-78.000.

Kordel, Jan A.: *See*—
Leonov, Mark A.; and Kordel, Jan A., 5,035,062, Cl. 33-533.000.

Korea Telecommunication Authority: *See*—
Shin, Dong K., 5,036,529, Cl. 375-119.000.

Kornylak, Andrew T., to Kornylak Corporation. Gravity roller conveyor construction. 5,035,314, Cl. 193-37.000.

Kornylak Corporation: *See*—
Kornylak, Andrew T., 5,035,314, Cl. 193-37.000.

Korthoff, Herbert W., to United States Surgical Corporation. Needle-suture attachment. 5,035,707, Cl. 606-224.000.

Kosal, Jeffrey A., to Dow Corning Corporation. Liquid detergent containing stabilized silicates. 5,035,827, Cl. 252-135.000.

Kostyrev, Sergei B.: *See*—
Arabei, Boris G.; Kostyrev, Sergei B.; Mints, Alexandr S.; Pronin, Lev A.; Ryzhonkov, Dmitry I.; Sopochkin, Sergei A.; Stepnov, Sergei A.; Esikman, Vladimir L.; Vasiliev, Andrei V.; and Kolgin, ALexandr P., 5,036,170, Cl. 219-10.410.

Koszi, Louis A.: *See*—
Dautremont-Smith, William C.; Katz, Avishay; Koszi, Louis A.; Segner, Bryan P.; and Thomas, Peter M., 5,036,023, Cl. 437-184.000.

Kounami, Yasuo: *See*—
Shioya, Nobuyuki; Kuroyanagi, Yoshimitsu; Kounami, Yasuo; and Kobayashi, Tatsuhiko, 5,035,893, Cl. 424-447.000.

Kourimsky, Friedrich A. J., to AMP Incorporated. Electrical terminal which has means to provide a reliable electrical connection. 5,035,638, Cl. 439-275.000.

Kousaka, Kazuo: *See*—
Baba, Shigeo; Shibata, Yukio; Kawamura, Takahiro; Takaoka, Hideo; Kimura, Tsuguo; Kousaka, Kazuo; Minato, Yoshihiro; Yokoyama, Naruo; Iida, Kozo; and Imai, Tetsuya, 5,036,035, Cl. 502-221.000.

Kovacs, Zsuzsanna M. I.: *See*—
Johansson, Karl N. G.; Kovacs, Zsuzsanna M. I.; Lindborg, Bjorn G.; and Stening, Goran B., 5,036,071, Cl. 514-261.000.

Kovtun, John M.: *See*—
Arora, Vijay K.; Jones, Gary V.; Kovtun, John M.; and Gabbard, Ronald G., 5,035,908, Cl. 426-388.000.

Kowada, Masunari: *See*—
Asano, Osamu; Shoji, Michihiro; and Kowada, Masunari, 5,035,549, Cl. 408-132.000.

Kowalczyk, Lawrence E.; Badesha, Santokh S.; Zukoski, Paul F.; Hordon, Monroe J.; Sterling, Steven M.; Lees, Barry A.; Elder, Frederick A.; and LaForce, Roger W., to Xerox Corporation. Processes for preparing chalcogenide alloys. 5,035,857, Cl. 420-579.000.

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Kozaki, Shyuichi; Okada, Masako; Funada, Fumiaki; Sasaki, Kei; Saito, Hideo; and Takeshita, Fusayuki, to Sharp Kabushiki Kaisha & Chisso Corp.; and Chisso Corp. Liquid crystal display device. 5,035,928, Cl. 428-1.000.

Kozawa, Kiyomitsu: *See*—
Yamada, Yasufumi; Nakamori, Yasutaka; Kozawa, Kiyomitsu; and Natsume, Yoshimi, 5,036,263, Cl. 318-116.000.

Koziol, Kenneth J.: *See*—
Alam, Abu S.; Sayeed, Fakrul A. A.; Koziol, Kenneth J.; and Kapoor, John N., 5,036,060, Cl. 514-110.000.

Kraemer, Nelson: *See*—
Wingo, James C., Jr.; and Kraemer, Nelson, 5,035,009, Cl. 2-414.000.

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Arora, Vijay K.; Jones, Gary V.; Kovtun, John M.; and Gabbard, Ronald G., 5,035,908, Cl. 426-388.000.

Kraft, Walter: *See*—
Frick, Beat; and Kraft, Walter, 5,036,351, Cl. 355-38.000.

Kragtwijk, Wilhelmus F.: *See*—
Kleingeld, Adriaan; Kooijmans, Kees R.; and Kragtwijk, Wilhelmus F., 5,035,860, Cl. 422-61.000.

Kramer, Bernhard: *See*—
Degler, Peter; and Kramer, Bernhard, 5,035,758, Cl. 156-61.000.

Kratzer, Michael; and Unsold, Eberhard. Device for selective destruction of cells. 5,035,693, Cl. 606-12.000.

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Pike-Biegunski, Maciej J.; Krebaum, Paul; and Arneson, Don A., 5,036,249, Cl. 313-509.000.

Kriegel, Jon: *See*—
Lee, J. Kelly; Kriegel, Jon; and Stephany, Thomas, 5,035,415, Cl. 271-265.000.

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Kladnig, Wolfgang; and Krivanec, Heinz, 5,036,037, Cl. 502-319.000.

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Metroka, Michael P.; Walczak, Thomas J.; and Krolopp, Robert K., 5,036,532, Cl. 379-58.000.

Krom, Thomas J.; and Casillo, Leonard G., to Square D Company. Drawout circuit breaker apparatus. 5,036,427, Cl. 361-339.000.

Kruder, George A., to HPM Corporation. Multi-channel extrusion screw with a zig-zag undercut barrier. 5,035,509, Cl. 366-89.000.

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Mathews, Marty K.; and Weber, Jeffrey A., 5,035,466, Cl. 297-337.000.

Kruger, Thomas: *See*—
Odenwalder, Heinrich; Kruger, Thomas; and Schumann, Hans-Joachim, 5,035,987, Cl. 430-544.000.

Krukonis, Val J.: *See*—
Berneburg, Philip L.; and Krukonis, Val J., 5,035,921, Cl. 427-226.000.

Krum, Richard G.; and Bucknam, Neil E., to Seagate Technology, Inc. Disk drive unit. 5,035,396, Cl. 248-635.000.

Kruzich, J. K., to Ford Motor Company. Unitized window system for a vehicle door. 5,035,083, Cl. 49-352.000.

KTM Locks CMT Group Division of Magna International Inc.: *See*—
Thau, Wolfgang, 5,035,528, Cl. 403-290.000.

Kubisch, John G., to General Motors Corporation. Counter gravity casting apparatus. 5,035,277, Cl. 164-255.000.

Kubo, Naoya: *See*—
Sasaki, Takashi; Kasumi, Takafumi; Kubo, Naoya; Kainuma, Keiji; Wako, Katsuo; Ishizuka, Hiroaki; Kawaguchi, Gaku; and Oda, Tsunero, 5,036,011, Cl. 435-255.000.

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Herz, Rudolf, 5,035,487, Cl. 350-245.000.

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White, Robert T.; Liebig, Thomas J.; and Switzer, Jeffrey K., 5,035,133, Cl. 72-350.000.

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Kilpatrick, Jerry B.; and Lincoln, Clifford F., 5,035,639, Cl. 439-290.000.

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Hoetzl, Max; and Lingle, Thomas M., 5,035,610, Cl. 432-77.000.

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Gardos, Michael N.; Lipp, Larry C.; and Griffin, William S., 5,035,836, Cl. 252-511.000.

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Teherani, Towfik H.; and Little, D. Dawn, 5,036,376, Cl. 357-30.000.

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Lunsford, David R.; and Llamas, Joe E., 5,036,481, Cl. 364-708.000.

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Arraudeau, Jean-Pierre; and Boelle, Anne, 5,035,885, Cl. 424-78.000.

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Bergquist, Dwight H.; Lorimor, Gary D.; and Wildy, Thomas E., 5,035,067, Cl. 34-231.000.

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Denzin, Dirk E.; Lull, Robert E.; and Schommer, Alan J., 5,035,327, Cl. 206-518.000.

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Agnemo, Roland A.; and Lunden-Lundgren, Birgitta E., 5,035,772, Cl. 162-72.000.

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Ehrenfels, Alfred L.; Lutz, David; and Parker, Martin, 5,035,646, Cl. 439-536.000.

Lutz, Michael A.; and Scheibert, Kristen A., to Dow Corning Corporation. Acrylamide polysiloxane composition with improved heat stability. 5,036,114, Cl. 522-20.000.

Lutz, Thomas: *See*—
Dietze, Werner; Fullemann, Rainer; and Lutz, Thomas, 5,035,862, Cl. 422-68.100.

Lutze, Theodor; and Weisshaupt, Dieter, to Aesculap AG. Retractor. 5,035,232, Cl. 128-20.000.

Lutzeler, Jorn: *See*—
Willmann, Hartmut; Dittmann, Ludwig; Heinz, Richard; and Lutzeler, Jorn, 5,036,418, Cl. 360-108.000.

Luxton, David. Frangible nonlethal projectile. 5,035,183, Cl. 102-502.000.

Lynch, Donald M.: *See*—
Hussein, Mamoun M.; Barcelon, Shirley A.; and Lynch, Donald M., 5,035,882, Cl. 424-58.000.

Lynch, Samuel E.: *See*—
Antoniades, Harry N.; and Lynch, Samuel E., 5,035,887, Cl. 424-85.200.

Lyon, Russell R.; and Tash, Alan S., to Herbert, Nicholas, a part interest. Hemostasis clip applicator. 5,035,692, Cl. 606-143.000.

Lysenko, Viktor G.; and Yudovin, Lev G. Twist drill for deep hole drilling. 5,035,552, Cl. 408-230.000.

M.E.P. Machine Elettroniche Piegatrici SpA: *See*—
Del Fabro, Giorgio; and Del Fabro, Marcello, 5,035,130, Cl. 72-162.000.

Maaser, Heidrun E., to Colgate-Palmolive Company. Liquid detergent having improved softening properties. 5,035,814, Cl. 252-8.700.

Mabuchi, Toshiaki, to Canon Kabushiki Kaisha. Phase controlled camera system having detachable lens. 5,036,399, Cl. 358-225.000.

MacDonald, Brian M.: *See*—
Rogerson, Stephen P.; and MacDonald, Brian M., 5,035,035, Cl. 29-25.350.

MacDougall, David B., to Westinghouse Brake and Signal Holdings Limited. Computing the length of a railway vehicle or a train of such vehicles. 5,036,478, Cl. 364-562.000.

Machida, Yasuhiko: *See*—
Asakawa, Shiro; Machida, Yasuhiko; Taomoto, Akira; and Nichogi, Katsuhiro, 5,035,835, Cl. 252-500.000.

MacKinnon, Hugh S., to Chevron Research Company. Streaming potential inhibitor for hydraulic fluids. 5,035,824, Cl. 252-75.000.

Macks, Harold R., to Lectron Products, Inc. Vehicle lamp control sensor. 5,036,437, Cl. 362-61.000.

Madsen, Dale R. Quick slip holder for bag machine. 5,035,165, Cl. 83-618.000.

Maeda, Masaya: *See*—
Okauchi, Shigeki; and Maeda, Masaya, 5,036,419, Cl. 360-109.000.

Maehashi, Yukio: *See*—
Matsushima, Osamu; Maehashi, Yukio; Katori, Shigetatsu; Nomura, Masahiro; Shinohara, Hiroko; Kariya, Kohichi; and Abe, Mitsue, 5,036,458, Cl. 364-200.000.

Maes, Herman E. M.: *See*—
Groeseneken, Guido V. L.; and Maes, Herman E. M., 5,036,273, Cl. 324-158.00T.

Maes, Paul J.: *See*—
Deboeck, Arthur M.; Baudier, Philippe R.; Fossion, Jacques J.; and Maes, Paul J., 5,036,100, Cl. 514-420.000.

MAG Aerospace Industries, Inc.: *See*—
Rozenblatt, Mike M.; and Volpe, Andrew L., 5,035,011, Cl. 4-665.000.

Maggioni, Giampietro: *See*—
Murari, Bruno; Morelli, Marco; and Maggioni, Giampietro, 5,036,269, Cl. 323-266.000.

Magid, Hillel; Shankland, Ian R.; Wilson, David P.; Cook, Kane D.; and Lund, Earl A. E., to Allied-Signal Inc. Azeotrope-like compositions of 1,1,2-trichloro-1,2,2-trifluoroethane, nitromethane, 1,2-dichloroethylene, and ethanol or isopropanol. 5,035,831, Cl. 252-171.000.

Magus, Ltd.: *See*—
Morales, Fernando, 5,036,389, Cl. 358-84.000.

Maietta, Linda S. Infant furniture. 5,035,015, Cl. 5-431.000.

Maillefer, Michel: *See*—
Katz, Larry; Maillefer, Michel; and Maillefer, Pierre-Luc, 5,035,618, Cl. 433-102.000.

Maillefer, Pierre-Luc: *See*—
Katz, Larry; Maillefer, Michel; and Maillefer, Pierre-Luc, 5,035,618, Cl. 433-102.000.

Main, Richard B., to Silicon Joule Corporation. Apparatus to adapt a window air conditioning unit to a sliding glass window sill. 5,035,116, Cl. 62-77.000.

Maitra, Kalyan K.; and Patel, Vijay B., to Allied Tube & Conduit Corporation. Method for producing galvanized tubing. 5,035,042, Cl. 29-527.400.

Majima, Eiji; Takino, Hiroaki; Izawa, Kunisuke; Yokozeki, Kenzo; and Kubota, Koji, to Ajinomoto Co., Inc. Process for producing L-serine. 5,036,004, Cl. 435-116.000.

Makela, Toivo, to Vierto, Raine. Car body frame straightening apparatus. 5,035,135, Cl. 72-422.000.

Makin, David: *See*—
Seabrook, Colin; and Makin, David, 5,035,448, Cl. 285-94.000.

Makino, Chiho: *See*—
Mori, Shigeki; and Makino, Chiho, 5,035,881, Cl. 424-54.000.

Makino, Naonori: *See*—
Horie, Seiji; and Makino, Naonori, 5,035,968, Cl. 430-58.000.

Makover, Yaacov: *See*—
Sadeh, Yaacov; and Makover, Yaacov, 5,035,503, Cl. 356-152.000.

Malleron, Jean-Luc: *See*—
Comte, Marie-Therese; Gueremy, Claude; Malleron, Jean-Luc; Mignani, Serge; Peyronel, Jean-Francois; and Truchon, Alain, 5,036,075, Cl. 514-293.000.

Mallozzi, Joseph D.: *See*—
Munson, Gerald L.; Daniels, Edward P., Jr.; and Mallozzi, Joseph D., 5,035,625, Cl. 434-332.000.

Malyne Enterprises, Inc.: *See*—
Hiles, Brian A., 5,036,444, Cl. 362-188.000.

Mamelson, Richard; and Watson, Allen, to Ardco, Inc. Refrigerator door assembly with thermal insulated door mounting frame. 5,035,085, Cl. 49-504.000.

Manabe, Yukimitsu: *See*—
Ohnishi, Kazumasa; Nakazawa, Toru; and Manabe, Yukimitsu, 5,036,245, Cl. 310-323.000.

Mania, Frank. Adjustable apparatus for spreading mortar and method therefor. 5,035,352, Cl. 222-611.200.

Mannesmann AG: *See*—
Gerretz, Josef, 5,035,132, Cl. 72-214.000.

Mannesmann Aktiengesellschaft: *See*—
Fink, Peter; and Figge, Dieter, 5,035,131, Cl. 72-190.000.

Mannio, Aaron, to Valmet Paper Machinery Inc. Apparatus for controlling the tilt angle of a doctor blade. 5,035,196, Cl. 118-126.000.

Mano, Morimasa: *See*—
Sangyoji, Kazuo; Mano, Morimasa; and Miyabayashi, Takeshi, 5,035,965, Cl. 429-124.000.

Mansfield, George A., Jr.: *See*—
Rorabaugh, Dale A.; Davis, Neil; Mansfield, George A., Jr.; and Brancaccio, Vince, 5,035,500, Cl. 351-226.000.

Marchi, Carlo A.: *See*—
Barillari, Piero; DeSanti, Pierluigi; Galderesi, Mario; Marchi, Carlo A.; Natili, Franco; Rossiello, Vincenzo; Settembre, Donato; and Urbinati, Francesco, 5,036,314, Cl. 340-717.000.

Marconi Company Limited, The: *See*—
Jairam, Hari L., 5,036,335, Cl. 343-767.000.

Maree, Johannes P., to CSIR. Water treatment for sulfate ion removal. 5,035,807, Cl. 210-711.000.

Maresca, Louis M.: *See*—
Kawakami, James H.; Harris, James E.; Maresca, Louis M.; and Robeson, Lloyd M., 5,036,150, Cl. 528-173.000.

Margolis, Richard J.: *See*—
Bachynsky, Maria O.; Infeld, Martin H.; Margolis, Richard J.; and Perla, Dennis A., 5,036,102, Cl. 514-455.000.

Marion Merrell Dow Inc.: *See*—
Rzeszotarski, Waclaw J.; Guzewska, Maria E.; McPherson, Daniel W.; Spagnuolo, Ciro J.; and Natalie, Kenneth J., Jr., 5,036,107, Cl. 514-648.000.

Mark VII Equipment, Inc.: *See*—
Mathews, W. Harry, 5,035,263, Cl. 137-615.000.

Markham, Brandon L. Closure means and holder for toothpaste tube. 5,035,385, Cl. 248-108.000.

Markunas, Albert L.; and Rozman, Gregory I., to Sundstrand Corporation. Aircraft turbine start from a low voltage battery. 5,036,267, Cl. 322-10.000.

Marlen Research Corporation: *See*—
Anderson, James E.; Dennis, Wendell; and Powers, Richard, 5,035,671, Cl. 452-37.000.

Marousek, Michael E.: *See*—
Shepard, Donald F.; Fenolia, Robert J.; Nagle, Dennis C.; and Marousek, Michael E., 5,035,949, Cl. 428-337.000.

Marowsky, Gerd: *See*—
Dorsch, Dieter; Eidenschink, Rudolf; Rieger, Bernhard; and Marowsky, Gerd, 5,035,839, Cl. 252-587.000.

Marquebielle, Gerard-Maurice: *See*—
Tanguy, Christian; Mesquida, Guy; and Marquebielle, Gerard-Maurice, 5,036,522, Cl. 372-46.000.

Marshall, Albert H.; Wolff, Ronald S.; McCormack, Robert T.; and Purvis, Edward J., to United States of America, Navy. Machine gun and minor caliber weapons trainer. 5,035,622, Cl. 434-23.000.

Martens, Michael A.: *See*—
Morich, Michael A.; Martens, Michael A.; and Brown, Robert W., 5,036,282, Cl. 324-318.000.

Martin, Christopher J., to University of Melbourne, The. Method of treating gastroesophageal reflux. 5,036,057, Cl. 514-54.000.

Martin, Marcel. Fishing hook assembly. 5,035,076, Cl. 43-37.000.

Martin Marietta Corporation: *See*—
Shepard, Donald F.; Fenolia, Robert J.; Nagle, Dennis C.; and Marousek, Michael E., 5,035,949, Cl. 428-337.000.

Martin, Patrick; and McMillan, Richard L., to Johnson & Johnson Consumer Products, Inc. Debonding tip for electrothermal dental bracket removal. 5,035,612, Cl. 433-3.000.

Martin, Tiby M. High pressure electronic common-rail fuel injection system for diesel engines. 5,035,221, Cl. 123-451.000.

Martinez, Eloy C., to Dow Chemical Company, The. Reinforced polymer compositions having improved distinctness of image. 5,036,118, Cl. 523-212.000.

Martis, Ronald J. J.: *See*—
Nathasingh, Davidson M.; Martis, Ronald J. J.; and Datta, Amitava, 5,035,755, Cl. 148-304.000.

Marukawa, Nobuaki: *See*—
Tanaka, Katsumasa; Satoh, Hitoshi; Kawakami, Heijiro; and Marukawa, Nobuaki, 5,035,752, Cl. 134-32.000.

Marz, Daniel, to General Instrument Corporation. On channel agile FM demodulator. 5,036,291, Cl. 329-325.000.

Maschinenfabrik Andritz Aktiengesellschaft: *See*—
Kladnig, Wolfgang; and Krivanec, Heinz, 5,036,037, Cl. 502-319.000.

Maschinenfabrik J. Dieffenbacher GmbH & Co.: *See*—
Bielfeldt, Friedrich B., 5,035,889, Cl. 425-371.000.

Mase, Syunzo: *See*—
Toyoda, Shuhei; Mase, Syunzo; Matsuura, Masami; and Kawaguchi, Shogo, 5,035,495, Cl. 350-588.000.

Masleid, Robert P.; and Sechler, Robert F., to International Business Machines Corporation. Pass gate multiplexer receiver circuit. 5,036,215, Cl. 307-243.000.

Mason, Wenda: *See*—
Puritch, George S.; Bradbury, Roderick; and Mason, Wenda, 5,035,741, Cl. 71-113.000.

Massa, Vincenzo; Merlo, Fabrizio; and Casolo Ginelli, Uberto, to Himont Italia S.r.l. Process for metallizing fibrous materials. 5,035,924, Cl. 427-299.000.

Massoudnia, Mohammad E., to Gusdorf Corporation. Stackable and nestible backs. 5,035,335, Cl. 211-188.000.

Massucco, Arthur A.: *See*—
Spencer, Richard H.; Shanley, Edward S.; and Massucco, Arthur A., 5,035,145, Cl. 73-744.000.

Mastache, Mark D., to Hewlett-Packard Company. Aerodynamically releasable lock for a disk file actuator assembly. 5,036,416, Cl. 360-105.000.

Masunaga, Makoto, to Canon Kabushiki Kaisha. Image communication apparatus. 5,036,390, Cl. 358-85.000.

MASX Energy Service Group, Inc.: *See*—
Bailey, Thomas F.; Campbell, John E.; and Kagler, Edmond, Jr., 5,035,292, Cl. 175-45.000.

Matchett, Noel D.: *See*—
Kehoe, Brian D.; and Matchett, Noel D., 5,036,542, Cl. 381-73.100.

Mate, David W.; Rogers, Duane E.; Billingsley, Henry C.; Broughton, George L.; and Belec, Glenn R., to Outboard Marine Corporation. Internal combustion engine. 5,035,211, Cl. 123-198.00E.

Mathews, Marty K.; and Weber, Jeffrey A., to Krueger International, Inc. Ergonomic chair. 5,035,466, Cl. 297-337.000.

Mathews, W. Harry, to Mark VII Equipment, Inc. Rotary bearing seal. 5,035,263, Cl. 137-615.000.

Mathews, Will W.; Serio, John A.; and Grinsteiner, James J., to Navistar International Transportation Corp. Engine valve cover gasket with electrical bridge. 5,035,637, Cl. 439-271.000.

Matson, James A.: *See*—
Lam, King S.; Mattei, Jacqueline; Leet, John E.; Matson, James A.; Tomita, Koji; and Kaplan, Murray A., 5,036,010, Cl. 435-253.500.

Matson, Kristin L.: *See*—
Huang, Victor T.; Hoseney, R. Carl; Graf, Ernst; Ghiasi, Katy; Miller, Linda C.; Weber, Jean L.; Gaertner, Karin C.; Matson, Kristin L.; Hunstiger, Antoinette M.; Rogers, Deborah K.; and Saguy, Israel A., 5,035,904, Cl. 426-243.000.

Matsubara, Masuo: *See*—
Shimizu, Norihiko; Sato, Kanji; Saiki, Toru; Goto, Kunio; Matsubara, Masuo; and Wada, Hiroshi, 5,035,410, Cl. 269-136.000.

Matsubara, Toshiyuki: *See*—
Takahira, Kenichi; Yamaguchi, Atsuo; Furuta, Shigeru; Inoue, Takesi; Matsubara, Toshiyuki; and Fujioka, Shuzo, 5,036,460, Cl. 364-200.000.

Matsui, Fumio: *See*—
Murata, Yasushi; and Matsui, Fumio, 5,036,208, Cl. 250-487.100.

Matsui, Teruhito: *See*—
Ohishi, Toshiyuki; Abe, Yuji; Sugimoto, Hiroshi; Ohisuka, Kenichi; and Matsui, Teruhito, 5,036,372, Cl. 357-16.000.

Matsukura, Yoshihiro; Hisazumi, Nobuyuki; and Shibuya, Kunio, to Kureha Kagaku Kogyo Kabushiki Kaisha. Heat-shrinkable laminated film. 5,035,955, Cl. 428-520.000.

Matsumoto, Kouji, to NEC Corporation. TTL-ECL level converting circuit. 5,036,225, Cl. 307-475.000.

Matsumoto, Manabu: *See*—
Sonobe, Tadasi; Katane, Mamoru; Ikeguchi, Takashi; Matsumoto, Manabu; Ueda, Shinjiro; Kobari, Toshiaki; Takahashi, Takao; Hayasaka, Toa; and Kitayama, Toyoki, 5,036,290, Cl. 328-235.000.

Matsumoto, Tom T. Truck body construction for separate handling of re-cyclable refuse. 5,035,564, Cl. 414-409.000.

Matsuo, Takao; Odaka, Hiroyuki; Suzuki, Tsuyoshi; and Tsuda, Masao, to Takeda Chemical Industries, Ltd. Calcium absorption promoter. 5,036,081, Cl. 514-336.000.

Matsuoka, Noriyuki, to Yamaichi Electric Manufacturing Co., Ltd. Electrical connector. 5,035,629, Cl. 439-70.000.

Matsushima, Osamu; Maehashi, Yukio; Katori, Shigetatsu; Nomura, Masahiro; Shinohara, Hiroko; Kariya, Kohichi; and Abe, Mitsue, to NEC Corporation. Information processor executing interruption program without saving contents of program counter. 5,036,458, Cl. 364-200.000.

Matsushita Electric Industrial Co., Ltd.: *See*—
Asakawa, Shiro; Machida, Yasuhiko; Taomoto, Akira; and Nichogi, Katsuhiro, 5,035,835, Cl. 252-500.000.
Kishimoto, Yoshinobu, 5,036,413, Cl. 360-96.500.
Morii, Takashi; and Ishibashi, Youichi, 5,036,394, Cl. 358-146.000.
Nakamura, Yasuhiro; Sakai, Ikuo; and Kawabuchi, Masami, 5,035,245, Cl. 128-661.090.
Nishikawa, Yukio; and Uesugi, Yuji, 5,035,202, Cl. 118-727.000.
Tamura, Hideharu; and Ogawa, Kazufumi, 5,035,782, Cl. 204-157.600.
Yasumoto, Yoshio; Kageyama, Sadashi; Inoue, Syuji; Abe, Yoshio; and Uwabata, Hideyo, 5,036,386, Cl. 358-12.000.
Yokotani, Yoichiro; Kagata, Hiroshi; Kato, Junichi; Nakatani, Seiichi; and Terada, Yukio, 5,036,424, Cl. 361-321.000.

Matsushita Electric Works, Ltd.: *See*—
Kikuchi, Atsushi; and Tatsuo, Yoshiyuki, 5,036,168, Cl. 200-5.00R.
Sakamoto, Jun-ichi; Onkura, Tetsuya; and Yoshida, Kouichi, 5,035,010, Cl. 4-567.000.

Matsushita, Yoh-ichi: *See*—
Ogawa, Kazuo; and Matsushita, Yoh-ichi, 5,036,065, Cl. 514-211.000.

Matsuura, Masami: *See*—
Toyoda, Shuhei; Mase, Syunzo; Matsuura, Masami; and Kawaguchi, Shogo, 5,035,495, Cl. 350-588.000.

Matsuyama, Yuji: *See*—
Moriyama, Masashi; Yamahira, Yutaka; and Matsuyama, Yuji, 5,035,200, Cl. 118-693.000.

Mattei, Jacqueline: *See*—
Lam, King S.; Mattei, Jacqueline; Leet, John E.; Matson, James A.; Tomita, Koji; and Kaplan, Murray A., 5,036,010, Cl. 435-253.500.

Matthews, Nicholas, to British Aerospace Public Limited Company. Method of and apparatus for returning an earth orbiting spacecraft to an earth pointing attitude after displacement therefrom. 5,035,381, Cl. 244-164.000.

Matthias, Jan H. Shirt cuff watch. 5,035,000, Cl. 2-123.000.

Matuschek, Josip. Method to obtain preload in solid one-piece ductile rivet installation. 5,035,041, Cl. 29-509.000.

Mauro, David J.: *See*—
Furcsik, Susan L.; and Mauro, David J., 5,035,912, Cl. 426-578.000.

Mausner, Eberhard: *See*—
Pfalzgraf, Manfred; Hickmann, Gerd; and Mausner, Eberhard, 5,035,213, Cl. 123-336.000.

Mazda Motor Corporation: *See*—
Baba, Fumiaki; Izumi, Masanori; Sawa, Kenji; and Kurumida, Susumu, 5,035,308, Cl. 192-0.052.
Shibata, Masanori; Yamamoto, Masaru; Okimoto, Haruo; and Tashima, Seiji, 5,035,114, Cl. 60-612.000.

Mazelie, Yves. Cigarette-lighter with built-in extinguisher device. 5,035,250, Cl. 131-256.000.

Mazur, Joseph F.: *See*—
Blackburn, Brian K.; Mazur, Joseph F.; and Gentry, Scott B., 5,036,467, Cl. 364-424.050.

Mazur, Robert G.; Stephenson, Robert C.; and Zier, Donald A., Jr., to Solid State Measurements, Inc. Apparatus for characterization of electrical properties of a semiconductor body. 5,036,271, Cl. 324-158.00P.

Mazurkiewicz, Marian. Disintegration of wood. 5,035,362, Cl. 241-1.000.

Mazzali, Stefano, to SGS-Thomson Microelectronics S.p.A. Method of manufacturing CMOS EPROM memory cells. 5,036,018, Cl. 437-43.000.

McArthur, Robert A.: *See*—
Daly, Paul D.; and McArthur, Robert A., 5,035,214, Cl. 123-337.000.

McCalla/Lackey Products Corporation: *See*—
Messick, Jerry C., Jr., 5,035,334, Cl. 211-134.000.

McCaslin, Shawn R., to Motorola Inc. Phase locked loop having low-frequency jitter compensation. 5,036,294, Cl. 331-1.00A.

McClintock, Jack M., to Morgan Adhesives Company. Hinge pressure sensitive adhesive tab closure for package. 5,035,518, Cl. 383-70.000.

McCormack, Robert T.: *See*—
Marshall, Albert H.; Wolff, Ronald S.; McCormack, Robert T.; and Purvis, Edward J., 5,035,622, Cl. 434-23.000.

McCormick, Frederick B., Jr.: *See*—
Cloonan, Thomas J.; Jewell, Jack L.; McCormick, Frederick B., Jr.; Miller, David A. B.; and Prise, Michael E., 5,036,512, Cl. 370-2.000.

McCoy, Glenn C.; and Yiskis, Eric N., to International Business Machines Corporation. Personal computer/host emulation system for handling host data with personal computer application programs at personal computers. 5,036,484, Cl. 364-900.000.

McCue, Richard H., Jr., to Stone & Webster Engineering Corporation. Cryogenic separation of gaseous mixtures. 5,035,732, Cl. 62-24.000.

McCullough, Timothy J. Flexible drive shaft casing. 5,035,055, Cl. 30-276.000.

McCumber, Larry L.: *See*—
Carlson, John G.; and McCumber, Larry L., 5,035,166, Cl. 83-801.000.

McEwan, Vince; and Patel, Milan, to Ledstar Inc. Light emitting diode clusters for display signs. 5,036,248, Cl. 313-500.000.

McGarry, John M.; Dilts, Howard S.; and Langenborg, Nils O., to United States of America, Navy. Non-continuous ignition train. 5,035,112, Cl. 60-39.823.

McGinnis, Douglas S.: *See—*
Jones, John D.; and McGinnis, Douglas S., 5,035,910, Cl. 426-478.000.

McGuire, Damon C.: *See—*
McGuire, Danny G.; McGuire, Damon C.; McGuire, Denver C.; and Sudberry, Mark E., 5,035,581, Cl. 417-36.000.

McGuire, Danny G.; McGuire, Damon C.; McGuire, Denver C.; and Sudberry, Mark E. Fluid level monitoring and control system. 5,035,581, Cl. 417-36.000.

McGuire, Denver C.: *See—*
McGuire, Danny G.; McGuire, Damon C.; McGuire, Denver C.; and Sudberry, Mark E., 5,035,581, Cl. 417-36.000.

McGunn, Edward T., to McGunn Safe, Inc. Safe with color-coded drawers emptying into color-coded containers. 5,035,187, Cl. 109-46.000.

McGunn Safe, Inc.: *See—*
McGunn, Edward T., 5,035,187, Cl. 109-46.000.

McKnight, Eileen M., executrix: *See—*
McKnight, William E., deceased; and McKnight, Eileen M., executrix, 5,036,255, Cl. 315-258.000.

McKnight, William E., deceased; and by McKnight, Eileen M., executrix. Balancing and shunt magnetics for gaseous discharge lamps. 5,036,255, Cl. 315-258.000.

McLean Midwest Corporation: *See—*
Neuenfeldt, Douglas L.; and Peterson, Roger A., 5,035,281, Cl. 165-76.000.

McMahon, Steven L.: *See—*
Nebesh, Eugene; Plundo, Robert A.; and McMahon, Steven L., 5,035,793, Cl. 208-143.000.

McMenamin, John E.: *See—*
Kerrigan, James E.; and McMenamin, John E., 5,035,040, Cl. 29-505.000.

McMillan, Richard L.: *See—*
Martin, Patrick; and McMillan, Richard L., 5,035,612, Cl. 433-3.000.

McMillen, Richard E.: *See—*
Dunn, Neil C.; McMillen, Richard E.; and Ricketts, Jon E., 5,035,675, Cl. 460-62.000.

McNay, Thomas O.: *See—*
Honkomp, Glenn A.; Tingley, Eugene H.; McNay, Thomas O.; and Bowsky, Benjamin, 5,035,653, Cl. 439-622.000.

McNicol, John D.; and Jemczyk, Iwan D., to Northern Telecom Limited. Method of communicating stuffing indications in a multi-level communications system. 5,036,526, Cl. 375-39.000.

McPherson, Daniel W.: *See—*
Rzeszotarski, Waclaw J.; Guzewska, Maria E.; McPherson, Daniel W.; Spagnuolo, Ciro J.; and Natalie, Kenneth J., Jr., 5,036,107, Cl. 514-648.000.

McSpadden, John T. Endodontic instrument. 5,035,617, Cl. 433-102.000.

Mead Corporation: *See—*
Gottschalk, Peter; Neckers, Douglas C.; Schuster, Gary B.; Adair, Paul C.; and Pappas, S. Peter, 5,035,621, Cl. 433-226.000.

MEC Co., Ltd.: *See—*
Haruta, Takashi; Nagano, Takaharu; Kishimoto, Takeyoshi; Yamada, Yasushi; and Yuno, Tomoko, 5,035,749, Cl. 134-2.000.

Mechanical Technology Incorporated: *See—*
Drake, Richard L., 5,035,117, Cl. 62-79.000.

Medemblik, John J.; and Devries, William, to Walinga Inc. Material transfer apparatus. 5,035,543, Cl. 406-39.000.

Medivir AB: *See—*
Johansson, Karl N. G.; Kovacs, Zsuzsanna M. I.; Lindborg, Bjorn G.; and Stening, Goran B., 5,036,071, Cl. 514-261.000.

Mehta, Devendra V.: *See—*
Rosberg, Louis; Mehta, Devendra V.; Rosberg, Aaron; and Billbury, Ron, 5,035,799, Cl. 210-232.000.

Mehta, Surendra C.: *See—*
Song, Suk-Zu; Mehta, Surendra C.; Murthy, Kuchi S.; Nesbitt, Russell U.; and Fawzi, Mahdi B., 5,035,884, Cl. 424-78.000.

Meier, Helmut-Martin: *See—*
Ohst, Holger; Meier, Helmut-Martin; and Kircher, Klaus, 5,036,151, Cl. 524-101.000.

Meki, Naoto, to Sumitomo Chemical Company, Limited. Intermediate compounds for an insecticidal and acaricidal pyrazole compound. 5,036,158, Cl. 564-300.000.

Menaged, David L. Portable, collapsible reading stand with adjustment means. 5,035,393, Cl. 248-456.000.

Mendenhall, George A. Helical split ring french fry. 5,035,915, Cl. 426-637.000.

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Nakada, Kazuhiko; Yasuda, Akihiro; and Ichikawa, Makoto, 5,035,710, Cl. 623-6.000.

Mensah, Thomas O.: *See—*
Chapin, John T.; Jackson, Charles W.; Mensah, Thomas O.; and Reynolds, Mickey R., 5,035,169, Cl. 89-1.340.

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Butts, Michael R.; and Batcheller, Jon A., 5,036,473, Cl. 364-489.000.

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Bender, Franz, 5,035,228, Cl. 123-568.000.

Merchant, Abid N., to Du Pont de Nemours, E. I., and Company. Binary azeotropic compositions of hexafluoropropylene/ethylene cyclic dimer with methanol or ethanol. 5,035,830, Cl. 252-171.000.

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Girard, Yves; Hamel, Pierre; and Delorme, Daniel, 5,036,067, Cl. 514-224.800.

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Baumgarth, Manfred; Gericke, Rolf; Bergmann, Rolf; De Peyer, Jacques; and Lues, Ingeborg, 5,036,068, Cl. 514-230.500.
Dorsch, Dieter; Eidenschink, Rudolf; Rieger, Bernhard; and Marowsky, Gerd, 5,035,839, Cl. 252-587.000.

Merlo, Fabrizio: *See—*
Massa, Vincenzo; Merlo, Fabrizio; and Casolo Ginelli, Uberto, 5,035,924, Cl. 427-299.000.

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Tanguy, Christian; Mesquida, Guy; and Marquebielle, Gerard-Maurice, 5,036,522, Cl. 372-46.000.

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Carter, Howard E.; Pugh, Joel A.; and Pierce, Byron C., 5,036,533, Cl. 379-59.000.

Messick, Jerry C., Jr., to McCalla/Lackey Products Corporation. Shelving apparatus having a repair cover. 5,035,334, Cl. 211-134.000.

Messinger, Robert. Vacuum control system for lifting systems. 5,035,456, Cl. 294-64.100.

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Berchem, Rutger, 5,035,718, Cl. 623-18.000.

Metroka, Michael P.; Walczak, Thomas J.; and Krolopp, Robert K., to Motorola, Inc. Portable telephone with power source/mode change during calls. 5,036,532, Cl. 379-58.000.

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Meyer, Daniel E.: *See—*
Braun, David L.; Rekow, Peter O.; and Meyer, Daniel E., 5,035,240, Cl. 128-205.270.

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Meyer, Robert J., to Duo-Fast Corporation. Safety dual-interlock system for fastener driving tool. 5,035,354, Cl. 227-7.000.

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Meynier, Patrick, to Institut Francais du Petrole. Anti-bounce device for a mass striking a target element. 5,035,297, Cl. 181-106.000.

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Michaelis, A. John; and Paton, A. David, to XAAR Ltd. Piezoelectric laminate and method of manufacture. 5,036,241, Cl. 310-358.000.

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Parker, Norman W.; Robinson, William P.; and Piccioni, Robert L., 5,035,787, Cl. 204-192.340.

Microelectronics and Computer Technology Corporation: *See—*
Smith, Robert T.; and Chung, Chang-Hwa, 5,036,379, Cl. 357-69.000.

Micron Technology, Inc.: *See—*
Sandhu, Gurtej S.; Schultz, Laurence D.; and Doan, Trung T., 5,036,015, Cl. 437-8.000.

Micronics Computers, Inc.: *See—*
Lin, Frank W.; Wong, Harvey C.; and Lim, Sam K., 5,036,313, Cl. 340-700.000.

Midorikawa, Masakazu: *See—*
Yada, Masami; Funamoto, Takao; Kitamura, Michio; Komatsu, Junzo; Midorikawa, Masakazu; and Yoshikawa, Tsugio, 5,035,579, Cl. 416-241.00R.

Migita, Haruyoshi: *See—*
Hashimoto, Minoru; and Migita, Haruyoshi, 5,035,366, Cl. 241-36.000.

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Comte, Marie-Therese; Gueremy, Claude; Malleron, Jean-Luc; Mignani, Serge; Peyronel, Jean-Francois; and Truchon, Alain, 5,036,075, Cl. 514-293.000.

Mihara, Tadashi: *See—*
Kawagishi, Hideyuki; Iwamoto, Hirofumi; Tsuboyama, Akira; and Mihara, Tadashi, 5,035,491, Cl. 350-350.00S.

Miki, Chihiro: *See—*
Imae, Michito; and Miki, Chihiro, 5,036,330, Cl. 342-357.000.

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Hassick, Denis E.; and Miknevich, Joseph P., 5,035,808, Cl. 210-728.000.

Miles, Peter: *See—*
Allen, William P.; and Miles, Peter, 5,035,259, Cl. 137-488.000.

Miller, Dale W.; and Crofutt, Thomas A., to Rockwell International Corporation. Fluid damper system for printing apparatus. 5,035,176, Cl. 101-148.000.

Miller, David A. B.: *See*—
Cloonan, Thomas J.; Jewell, Jack L.; McCormick, Frederick B., Jr.; Miller, David A. B.; and Prise, Michael E., 5,036,512, Cl. 370-2.000.
Miller, Linda C.: *See*—
Huang, Victor T.; Hoseney, R. Carl; Graf, Ernst; Ghiasi, Katy; Miller, Linda C.; Weber, Jean L.; Gaertner, Karin C.; Matson, Kristin L.; Hunstiger, Antoinette M.; Rogers, Deborah K.; and Saguy, Israel A., 5,035,904, Cl. 426-243.000.
Miller, Regis R., to Stylex, Inc. Side panel conversion kit for a desk. 5,035,470, Cl. 312-195.000.
Miller, Thomas W.: *See*—
Chapman, C. Weldon; and Miller, Thomas W., 5,036,333, Cl. 342-370.000.
Milliken Research Corporation: *See*—
Elliott, John L., 5,035,031, Cl. 26-69.00R.
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Harashima, Noboru; Mimura, Kazuhiro; Sasaki, Yosuke; Okubo, Hideaki; Nogawa, Makoto; and Fujimoto, Satoshi, 5,035,599, Cl. 425-150.000.
Minagawa, Tsutomu: *See*—
Uemura, Tadashi; Minagawa, Tsutomu; and Saito, Sadahiro, 5,035,742, Cl. 75-623.000.
Minakawa, Kuninori: *See*—
Sakiyama, Tetsuo; Tsuyama, Seishi; and Minakawa, Kuninori, 5,035,754, Cl. 148-159.000.
Minato, Yoshihiro: *See*—
Baba, Shigeo; Shibata, Yukio; Kawamura, Takahiro; Takaoka, Hideo; Kimura, Tsuguo; Kousaka, Kazuo; Minato, Yoshihiro; Yokoyama, Naruo; Iida, Kozo; and Imai, Tetsuya, 5,036,035, Cl. 502-221.000.
Minden, Elizabeth G. Ballet slipper and method of manufacturing a ballet slipper. 5,035,069, Cl. 36-113.000.
Mine, Katsutoshi; Kogo, Akemi; Yamakawa, Kimio; and Nakayoshi, Kazumi, to Toray Silicone Company, Inc. Method of treating a hardened semiconductor resin encapsulated layer with ultraviolet radiation. 5,036,024, Cl. 437-211.000.
Minnesota Mining and Manufacturing Company: *See*—
Blette, Russell E.; and Roeser, John O., 5,035,350, Cl. 222-212.000.
Braun, David L.; Rekow, Peter O.; and Meyer, Daniel E., 5,035,240, Cl. 128-205.270.
Hollingsworth, Elmont E., 5,035,636, Cl. 439-215.000.
More, James R.; Olsen, Arnold T.; and Young, John S., 5,035,766, Cl. 156-581.000.
Minolta Camera Kabushiki Kaisha: *See*—
Enoguchi, Yuji; Natsuhara, Toshiya; and Mizuno, Hiroshi, 5,035,197, Cl. 118-647.000.
Hatamori, Osamu; Hata, Yoshiaki; Sumitani, Atsushi; Kobayashi, Haruo; and Kato, Kinya, 5,036,346, Cl. 354-195.120.
Hoda, Takeo; Taniguchi, Nobuyuki; and Seigenji, Kiyoshi, 5,036,342, Cl. 354-21.000.
Inoue, Manabu; Taniguchi, Nobuyuki; Hata, Yoshiaki; Hoda, Takeo; Kudo, Yoshinobu; and Ueda, Hiroshi, 5,036,344, Cl. 354-106.000.
Kageyama, Hitoshi, 5,035,485, Cl. 350-164.000.
Kamimura, Kuniaki; Sawada, Kenji; and Yamade, Yasushi, 5,036,352, Cl. 355-45.000.
Miyamoto, Hirohisa, 5,036,354, Cl. 355-75.000.
Nishimori, Kadotaro; Ito, Masazumi; Higashio, Kimihiko; and Kato, Akio, 5,036,357, Cl. 355-202.000.
Tanaka, Osamu, 5,035,493, Cl. 350-429.000.
Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Nakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, 5,036,350, Cl. 354-475.000.
Toda, Kunio; Yokoyama, Tomoaki; and Nagao, Taisuke, 5,036,369, Cl. 355-298.000.
Yamaguchi, Ikunori; and Ikenoue, Yoshikazu, 5,036,476, Cl. 364-519.000.
Yoshida, Narutaka, 5,036,358, Cl. 355-203.000.
Mints, Alexandr S.: *See*—
Arabei, Boris G.; Kostyrev, Sergei B.; Mints, Alexandr S.; Pronin, Lev A.; Ryzhonkov, Dmitry I.; Sopochkin, Sergei A.; Stepnov, Sergei A.; Esikman, Vladimir L.; Vasiliev, Andrei V.; and Kolgin, ALexandr P., 5,036,170, Cl. 219-10.410.
Mips Co., Ltd: *See*—
Kaneda, Takashi; and Villwock, Thomas, 5,036,429, Cl. 361-392.000.
Mirenna, Luigi: *See*—
Colle, Roberto; Camaggi, Giovanni; Gozzo, Franco; Ratti, Giuseppina; Mirenna, Luigi; and Garavaglia, Carlo, 5,036,094, Cl. 514-383.000.
Mirey, Jean-Claude: *See*—
Lamotte, Lionel; Mirey, Jean-Claude; Omiel, Jean; and Gaquere, Jean-Pierre, 5,035,556, Cl. 409-218.000.
Miska, Werner: *See*—
Geiger, Reinhard; and Miska, Werner, 5,035,999, Cl. 435-23.000.
Mita Industrial Co., Ltd.: *See*—
Shibanaka, Mitsugu; and Yamamoto, Haruo, 5,035,414, Cl. 271-227.000.
Mita, Seiichi: *See*—
Bergmans, Johannes W. M.; Mita, Seiichi; Izumita, Morishi; and Doi, Nobukazu, 5,036,524, Cl. 375-12.000.
Mitchell, Allan T., to Texas Instruments Incorporated. Floating-gate memory cell with tailored doping profile. 5,036,375, Cl. 357-235.000.
Mitchell, Samuel B. H., to Costain Building Products Limited. Arcuate precast tunnel lining segments. 5,035,538, Cl. 405-151.000.
Mitobe, Isami: *See*—
Shiratori, Naoki; Ueda, Yoshiaki; and Mitobe, Isami, 5,035,449, Cl. 292-48.000.
Mitsubishi Denki K.K.: *See*—
Kako, Hajime, 5,035,217, Cl. 123-339.000.
Ohuchi, Hirofumi, 5,035,215, Cl. 123-339.000.
Uchinami, Masanobu; and Takahashi, Toshihisa, 5,035,220, Cl. 123-436.000.
Mitsubishi Denki Kabushiki Kaisha: *See*—
Isozumi, Shuzoo, 5,035,151, Cl. 74-7.00A.
Isozumi, Shuzoo, 5,036,213, Cl. 290-48.000.
Itoh, Noboru, 5,035,497, Cl. 350-611.000.
Iwasaki, Takeshi; Yatomi, Takeshi; and Sakai, Akihiro, 5,036,174, Cl. 219-69.120.
Kamitani, Toshiki, 5,036,295, Cl. 331-10.000.
Koiwa, Mitsuru, 5,035,229, Cl. 123-626.000.
Morita, Shigeki, 5,035,160, Cl. 74-866.000.
Noda, Minoru, 5,036,017, Cl. 437-41.000.
Ohishi, Toshiyuki; Abe, Yuji; Sugimoto, Hiroshi; Ohisuka, Kenichi; and Matsui, Teruhito, 5,036,372, Cl. 357-16.000.
Tada, Masuo; Hata, Takeki; Fukumoto, Takaaki; and Ohmori, Toshiaki, 5,035,750, Cl. 134-7.000.
Tajima, Masaaki, 5,036,238, Cl. 310-214.000.
Takahira, Kenichi; Yamaguchi, Atsuo; Furuta, Shigeru; Inoue, Takesi; Matsubara, Toshiyuki; and Fujioka, Shuzo, 5,036,460, Cl. 364-200.000.
Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
Soeda, Koji; Kubota, Yoshiya; Okamoto, Shoji; Kubota, Akinori; Kobayashi, Michihito; Ijiri, Masaaki; Ozawa, Susumu; Tomosada, Kiyoshi; Irie, Nobuhiko; Hasegawa, Akira; Katayama, Hideaki; Murakami, Toshifumi; and Sakaguchi, Katsuyoshi, 5,035,591, Cl. 425-40.000.
Mitsubishi Kasei Corporation: *See*—
Shioya, Nobuyuki; Kuroyanagi, Yoshimitsu; Kounami, Yasuo; and Kobayashi, Tatsuhiko, 5,035,893, Cl. 424-447.000.
Mitsubishi Kenki Kabushiki Kaisha: *See*—
Sakaue, Yoshikazu; Sumi, Kazuhiko; and Nakajima, Keiji, 5,036,544, Cl. 382-24.000.
Mitsubishi Metal Corporation: *See*—
Ikenaga, Kouichi; and Arai, Taisuo, 5,035,544, Cl. 407-105.000.
Mitsubishi Mining & Cement Co., Ltd.: *See*—
Yoshimura, Toru; Uchida, Akio; Ito, Takaaki; and Saruwatari, Nobuya, 5,036,420, Cl. 361-118.000.
Mitsubishi Paper Mills Limited: *See*—
Sekine, Mikiya; and Hiraishi, Shigetoshi, 5,036,039, Cl. 503-217.000.
Mitsubishi Pencil Co., Ltd.: *See*—
Konose, Yoshiomi, 5,035,525, Cl. 401-278.000.
Sakurai, Kiyokazu, 5,035,524, Cl. 401-206.000.
Mitsubishi Rayon Company, Ltd.: *See*—
Tokuda, Shuichirou; Furukawa, Noriyuki; and Kawai, Yoshinori, 5,036,435, Cl. 362-31.000.
Mitsui, Isamu: *See*—
Taguchi, Fumiaki; Mitsui, Isamu; Hara, Kinichi; Hayashi, Masaro; Ezawa, Kunio; Fukunaga, Kenichi; and Kuranari, Jun, 5,035,995, Cl. 435-4.000.
Mitsui Kinzoku Kogyo Kabushiki Kaisha: *See*—
Shiratori, Naoki; Ueda, Yoshiaki; and Mitobe, Isami, 5,035,449, Cl. 292-48.000.
Mitsui Petrochemical Industries, Ltd.: *See*—
Yamasaki, Kazuyuki; Yamamoto, Kimio; Watanabe, Masanobu; Kan, Kojiro; and Nakayama, Yoshio, 5,035,802, Cl. 210-440.000.
Mitsutake, Kenichiro: *See*—
Shibata, Mitsuru; Hiramatsu, Yoshiyuki; Adachi, Ryoichi; and Mitsutake, Kenichiro, 5,035,739, Cl. 71-91.000.
Mitutoyo Corporation: *See*—
Nishioki, Nobuhisa; and Itabashi, Tatsuo, 5,035,507, Cl. 356-356.000.
Miura, Kenji: *See*—
Kurono, Masayasu; Usui, Toshinao; Miura, Kenji; Kondo, Yasuaki; and Sawai, Kiichi, 5,036,080, Cl. 514-333.000.
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Miyabayashi, Takeshi: *See*—
Sangyoji, Kazuo; Mano, Morimasa; and Miyabayashi, Takeshi, 5,035,965, Cl. 429-124.000.
Miyago, Makoto; Oka, Hiroshi; Imaya, Akihiko; Kato, Hiroaki; Nagayasu, Takayoshi; and Hirobe, Toshihiko, to Sharp Kabushiki Kaisha. Thin film semiconductor array device. 5,036,370, Cl. 357-4.000.
Miyake, Junichi: *See*—
Aoki, Takashi; Terayama, Satoshi; and Miyake, Junichi, 5,035,157, Cl. 74-866.000.
Miyama, Shuji: *See*—
Ohkumo, Hiroya; and Miyama, Shuji, 5,035,219, Cl. 123-425.000.
Miyamoto, Hirohisa, to Minolta Camera Kabushiki Kaisha. Document size detection device. 5,036,354, Cl. 355-75.000.
Miyamoto, Kouichi: *See*—
Takahashi, Shoji; and Miyamoto, Kouichi, 5,035,059, Cl. 30-392.000.

Miyao, Osami: *See*—
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Miyauchi, Katsuki: *See*—
Ishikawa, Akira; Ito, Yukio; Okamoto, Hiroshi; Kudo, Tetsuichi; and Miyauchi, Katsuki, 5,035,478, Cl. 350-96.120.
Miyoshi, Ikkei: *See*—
Nishiguchi, Masanori; Sekiguchi, Takeshi; Miyoshi, Ikkei; and Nishio, Kiyoshi, 5,035,087, Cl. 51-131.100.
Mizukoshi, Masashi, to Toyota Jidosha Kabushiki Kaisha. Fuel injection control apparatus of internal combustion engine. 5,035,225, Cl. 123-493.000.
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Enoguchi, Yuji; Natsuhara, Toshiya; and Mizuno, Hiroshi, 5,035,197, Cl. 118-647.000.
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Kato, Yuichi; Yoshida, Hiroshi; and Mizusawa, Kozo, 5,035,463, Cl. 296-223.000.
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Harms, Paul; and Sehr, Willibald, 5,035,290, Cl. 172-1.000.
Mobil Oil Corporation: *See*—
Aufdembrink, Brent A.; Chester, Arthur W.; and Chu, Pochen, 5,036,159, Cl. 585-275.000.
Chen, Catherine S. H.; and Rodewald, Paul G., 5,035,818, Cl. 252-47.500.
Gulati, Kailash C.; and Prodanovic, Anton, 5,035,541, Cl. 405-217.000.
Moffat, Karen A.: *See*—
Hsieh, Bing R.; Gruber, Robert J.; Moffat, Karen A.; Mychajlowskij, Walter; and Paine, Anthony J., 5,035,970, Cl. 430-109.000.
Mohn, Frank, to Framo Developments (UK) Limited. Fluid mixing or homogenization. 5,035,842, Cl. 261-76.000.
Molex Incorporated: *See*—
Berg, B. Alan, 5,035,658, Cl. 439-748.000.
Dixon, Daniel A.; Lee, Hsin; Zielke, Henry; Mysiak, Eugene J.; and Brunker, David L., 5,035,651, Cl. 439-609.000.
Peterson, Bruce A., 5,035,659, Cl. 439-751.000.
Pike-Biegunski, Maciej J.; Krebaum, Paul; and Arneson, Don A., 5,036,249, Cl. 313-509.000.
Mollberg, Henri R.: *See*—
Hansen, Bertil V.; Gunnarsson, Per-Olov G.; Mollberg, Henri R.; and Johansson, Sven-Åke, 5,036,062, Cl. 514-176.000.
Mollenauer, Linn F., to AT&T Bell Laboratories. Long distance soliton lightwave communication system. 5,035,481, Cl. 350-96.160.
Moller, Rudolf: *See*—
Gottling, Helmut; Moller, Rudolf; Muller, Peter; and Scharnowski, Gerhard, 5,035,171, Cl. 92-137.000.
Mondek, Martin J.: *See*—
Bland, Gerald F.; Mondek, Martin J.; and Zdanowicz, Lawrence E., 5,035,663, Cl. 440-75.000.
Bland, Gerald F.; Mondek, Martin J.; and Zdanowicz, Lawrence E., 5,035,664, Cl. 440-75.000.
Mondin, Myriam M.: *See*—
Durbut, Patrick J.; Mondin, Myriam M.; and Broze, Guy J., 5,035,826, Cl. 252-121.000.
Mondre, Steven J. Nicotine-containing dental floss. 5,035,252, Cl. 132-321.000.
Monopoli, Dion V., to Gallagher Electronics Limited. Electric fence line. 5,036,166, Cl. 174-128.100.
Monsanto Company: *See*—
Coran, Aubert Y., 5,036,132, Cl. 524-526.000.
Coran, Aubert Y., 5,036,133, Cl. 524-526.000.
Olander, Jitka V.; Connolly, Daniel T.; Adams, Steven P.; and Feder, Joseph, 5,036,003, Cl. 435-70.100.
Montedison S.p.A.: *See*—
Colle, Roberto; Camaggi, Giovanni; Gozzo, Franco; Ratti, Giuseppina; Mirenna, Luigi; and Garavaglia, Carlo, 5,036,094, Cl. 514-383.000.
Mooch Domsjo AB: *See*—
Agnemo, Roland A.; and Lunden-Lundgren, Birgitta E., 5,035,772, Cl. 162-72.000.
Moog Automotive, Inc.: *See*—
Sellers, Roger G.; and Schmidt, George R., 5,035,406, Cl. 267-48.000.
Morales, Fernando, to Magus, Ltd.; and Cayman Corporate Services. Satellite controlled audience polling system. 5,036,389, Cl. 358-84.000.
Moran, Dan; and Gerlitz, Yonatan. UV Exposure monitoring system. 5,036,311, Cl. 340-600.000.
Moran, Michael J., to CCL Industries Inc. Method and apparatus for maintaining a pressure within a product dispenser. 5,035,351, Cl. 222-394.000.
Moran, Ray: *See*—
Janko, Michael; Moran, Ray; and Carlson, Norman, 5,035,345, Cl. 222-5.000.
More, James R.; Olsen, Arnold T.; and Young, John S., to Minnesota Mining and Manufacturing Company. Deformable die for use with sealant pads. 5,035,766, Cl. 156-581.000.
Morelli, Marco: *See*—
Murari, Bruno; Morelli, Marco; and Maggioni, Giampietro, 5,036,269, Cl. 323-266.000.
Morgan Adhesives Company: *See*—
McClintock, Jack M., 5,035,518, Cl. 383-70.000.
Morgan Construction Company: *See*—
Koelling, Robert K., Sr., 5,035,676, Cl. 464-135.000.
Morgan, W. R.: *See*—
Lissaman, Peter B. S.; Morgan, W. R.; Cowley, Martyn B.; Sink, Charles J.; and Watson, William D., 5,035,382, Cl. 244-190.000.
Mori, Seiichi, to Kabushiki Kaisha Toshiba. Semiconductor device having an improved bonding pad. 5,036,383, Cl. 357-71.000.
Mori, Shigeki; and Yokosuka, Naomi, to Sunstar Kabushiki Kaisha. Dentifrice composition. 5,035,880, Cl. 424-54.000.
Mori, Shigeki; and Makino, Chiho, to Sunstar Kabushiki Kaisha. Dentifrice composition. 5,035,881, Cl. 424-54.000.
Mori, Tamotsu; and Kikuchi, Katsuji, to Nikko Co., Ltd. Air-mat apparatus. 5,035,016, Cl. 5-453.000.
Morich, Michael A.; Martens, Michael A.; and Brown, Robert W., to Picker International, Inc. Biplanar gradient coil for magnetic resonance imaging systems. 5,036,282, Cl. 324-318.000.
Morigaki, Masakazu: *See*—
Nakamura, Yoshisada; Morigaki, Masakazu; Ishii, Yoshio; and Sakanoue, Kei, 5,035,988, Cl. 430-551.000.
Morii, Takashi; and Ishibashi, Youichi, to Matsushita Electric Industrial Co., Ltd. Videotext receiver. 5,036,394, Cl. 358-146.000.
Morikawa, Kiyoshi: *See*—
Kobayashi, Kazuo; Yamada, Yoshinori; Morikawa, Kiyoshi; Kurumada, Masakazu; and Sugihara, Masanori, 5,036,509, Cl. 369-75.200.
Morimoto, Takeshi; and Yoshida, Naoki, to Asahi Glass Co., Ltd. Highly durable cathode with low hydrogen overvoltage and method for producing the same. 5,035,790, Cl. 204-290.00R.
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Ozeki, Kohji; Tsukamoto, Yoshitsugu; Yaginuma, Hideya; and Sato, Makoto, 5,036,052, Cl. 514-19.000.
Morita, Etsuji: *See*—
Tanaka, Shoji; Yamauchi, Hisao; Yamada, Yukio; Ohnuki, Masayoshi; Morita, Etsuji; Toyoshima, Mitsunobu; Wada, Yasuo; Hinoshita, Hirotaka; Ikeda, Wataru; Aihara, Etsuji; Kobayashi, Tutomu; and Suguro, Kuniaki, 5,035,597, Cl. 425-135.000.
Morita, Iwao: *See*—
Kimura, Kiyoshi; and Morita, Iwao, 5,036,059, Cl. 514-89.000.
Kimura, Kiyoshi; Kise, Masahiro; and Morita, Iwao, 5,036,098, Cl. 514-438.000.
Morita, Shigeki, to Mitsubishi Denki Kabushiki Kaisha. Automatic transmission control system for a vehicle. 5,035,160, Cl. 74-866.000.
Morita, Yosihiko: *See*—
Watanabe, Hiroshi; Hioki, Toshiaki; and Morita, Yosihiko, 5,036,404, Cl. 358-337.000.
Moriya, Koichi: *See*—
Shiokawa, Kozo; Tsuboi, Shinichi; Sasaki, Shoko; Moriya, Koichi; Hattori, Yumi; and Shibuya, Katsuhiko, 5,036,082, Cl. 514-338.000.
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Morizumi, Kenichi: *See*—
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Morris, Jerry R.; and Squires, George A., to Combo Corporation. Trundle trolley for a sliding door track assembly. 5,035,025, Cl. 16-97.000.
Morton, Jay, to City of Hope, The; and Morton, Lucille T., a part interest. Easy-open and reclosable container. 5,035,343, Cl. 220-270.000.
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Morton, Jay, 5,035,343, Cl. 220-270.000.
Moss, Gaylord E.; Cohn, Brian D.; Chern, Mao-Jin J.; Cook, Lacy G.; and Ferrer, John J., to Hughes Aircraft Company. Biocular holographic helmet mounted display. 5,035,474, Cl. 350-3.700.
Moss, Robert M.: *See*—
Davis, Lorne A., Jr.; Hart, Timothy J.; Moss, Robert M.; and Pepin, Gregory P., 5,036,193, Cl. 250-255.000.
Mosse, Madeleine: *See*—
Van Broeck, Didier; and Mosse, Madeleine, 5,036,077, Cl. 514-317.000.
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Defibaugh, George R.; and Mosser, Benjamin H., III, 5,035,650, Cl. 439-609.000.
Motarjemi, David. Automatic programming and erasing device for electrically erasable programmable read-only memories. 5,036,488, Cl. 365-52.000.
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Cotney, Garland D., 5,035,034, Cl. 29-25.010.
Eastmond, Bruce C., 5,036,540, Cl. 381-47.000.
Freeburg, Thomas A., 5,036,515, Cl. 371-5.500.
Lester, Theodore V., 5,036,312, Cl. 340-679.000.
Lin, Paul T., 5,036,381, Cl. 357-70.000.
McCaslin, Shawn R., 5,036,294, Cl. 331-1.00A.
Metroka, Michael P.; Walczak, Thomas J.; and Krolopp, Robert K., 5,036,532, Cl. 379-58.000.
Rollins, Norman T.; and Gerosa, Gianfranco, 5,036,217, Cl. 307-272.200.
Spear, Stephen L., 5,036,531, Cl. 379-58.000.
Moureaux, Philippe, to Automobiles Peugeot; and Automobiles Citroen. Impervious resilient membrane and hydropneumatic accumulator fitted with that membrane. 5,036,110, Cl. 121-137.000.
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Mulliner, Leslie E., 5,035,409, Cl. 269-21.000.
MRI Technologies: *See*—
Chesavage, Jay A., 5,036,280, Cl. 324-308.000.

MTU Motoren-und Turbinen-Union Munchen GmbH: *See*—
Daines, John W.; Benn, Bryan L.; and Stoll, Walter H., 5,035,411, Cl. 269-231.000.
Popp, Joachim, 5,035,572, Cl. 415-12.000.

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Mueller, Richard A.: *See*—
Chinn, Leland J.; Desai, Bipinchandra N.; and Mueller, Richard A., 5,036,105, Cl. 514-532.000.

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von der Eltz, Herbert; Guder, Hans-Joachim; and Muhlegger, Klaus, 5,035,998, Cl. 435-18.000.

Mukasa, Mitsuhiro: *See*—
Hiroi, Masakazu; Naito, Masataka; Hayakawa, Kimiaki; Kobayashi, Kenji; and Mukasa, Mitsuhiro, 5,035,412, Cl. 270-053.000.

Mukoyama, Kenichi: *See*—
Sugino, Takao; Kawamura, Toshio; Asai, Masamichi; Yamada, Hiroshi; Mukoyama, Kenichi; Takahashi, Akira; and Hikima, Hiroshi, 5,035,919, Cl. 427-140.000.

Mulhauser, Paul J.: *See*—
Alchas, Paul G.; Augello, Frank A.; Brooks, Christopher J.; Cutshall, Tony A.; DiPisa, Joseph A., Jr.; Williams, Stuart K.; Gabel, Jonathan B.; Mulhauser, Paul J.; Prais, Wes; Jarrell, Bruce E.; and Rose, Deborah G., 5,035,708, Cl. 623-1.000.

Muller, Klaus-Dieter: *See*—
Gork, Fritz-Peter; Muller, Klaus-Dieter; and Schweitzer, Doris, 5,036,001, Cl. 435-31.000.

Muller, Manfred H.: *See*—
Jungert, Horst A.; and Muller, Manfred H., 5,036,232, Cl. 307-542.000.

Muller, Peter: *See*—
Gottling, Helmut; Moller, Rudolf; Muller, Peter; and Scharnowski, Gerhard, 5,035,171, Cl. 92-137.000.

Muller, Peter H., to Von Duprin, Inc. Door exit-delaying means. 5,035,450, Cl. 292-92.000.

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Jeffers, John M.; Mundy, S. Wayne; and Knight, Stephen P., 5,036,537, Cl. 380-20.000.

Munson Electronics, Inc.: *See*—
Munson, Gerald L.; Daniels, Edward P., Jr.; and Mallozzi, Joseph D., 5,035,625, Cl. 434-332.000.

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Suzuki, Teruo; Ogawa, Kenichi; and Murakami, Hiroshi, 5,035,780, Cl. 204-129.350.

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Soeda, Koji; Kubota, Yoshiya; Okamoto, Shoji; Kubota, Akinori; Kobayashi, Michihito; Ijiri, Masaaki; Ozawa, Susumu; Tomosada, Kiyoshi; Irie, Nobuhiko; Hasegawa, Akira; Katayama, Hideaki; Murakami, Toshifumi; and Sakaguchi, Katsuyoshi, 5,035,591, Cl. 425-40.000.

Muraoka, Kunihiko: *See*—
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Murasawa, Yoshihiro, to Canon Kabushiki Kaisha. Image forming apparatus including developer carrying member having repelling magnetic brush. 5,036,364, Cl. 355-251.000.

Murase, Heihachi: *See*—
Tomiyama, Takeshi; Hashimoto, Sadaaki; and Murase, Heihachi, 5,035,934, Cl. 428-40.000.

Murata Manufacturing Co., Ltd.: *See*—
Omori, Nagato; Sano, Harunobu; Kohno, Yoshiaki; and Sakabe, Yukio, 5,036,425, Cl. 361-321.000.
Watanabe, Shizuharu; Tani, Hiroji; and Nagata, Keisuke, 5,036,027, Cl. 501-96.000.

Murata, Yasushi; and Matsui, Fumio, to Pioneer Electronic Corporation. Luminescent screen. 5,036,208, Cl. 250-487.100.

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Murray, Donald W., to Spectra Technologies Inc. Trailer hitch alignment device. 5,035,441, Cl. 280-477.000.

Murthy, Kuchi S.: *See*—
Song, Suk-Zu; Mehta, Surendra C.; Murthy, Kuchi S.; Nesbitt, Russell U.; and Fawzi, Mahdi B., 5,035,884, Cl. 424-78.000.

Mussar, Keith: *See*—
Bilinski, Carl; Choi, Hoyeon; and Mussar, Keith, 5,035,902, Cl. 426-12.000.

Musya, Masataka: *See*—
Hosoya, Rituko; Yamada, Takahiro; and Musya, Masataka, 5,035,624, Cl. 434-309.000.

Muz, Edwin, to Nicolay GmbH. Holder sleeve for positioning a detecting and measuring sensor. 5,035,243, Cl. 128-633.000.

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Hsieh, Bing R.; Gruber, Robert J.; Moffat, Karen A.; Mychajlowskij, Walter; and Paine, Anthony J., 5,035,970, Cl. 430-109.000.

Myers, Mark; and Levy, Sandy, to Dimensional Images, Inc. Three dimensional picture. 5,035,929, Cl. 428-30.000.

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Dixon, Daniel A.; Lee, Hsin; Zielke, Henry; Mysiak, Eugene J.; and Brunker, David L., 5,035,651, Cl. 439-609.000.

Naae, Douglas G.: *See*—
Kieke, Dan E.; and Naae, Douglas G., 5,035,288, Cl. 166-274.000.

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Nagano, Akihiko: *See*—
Tsunekawa, Tokuichi; Nagano, Akihiko; and Konishi, Kazuki, 5,036,347, Cl. 354-400.000.

Nagano, Takaharu: *See*—
Haruta, Takashi; Nagano, Takaharu; Kishimoto, Takeyoshi; Yamada, Yasushi; and Yuno, Tomoko, 5,035,749, Cl. 134-2.000.

Nagao, Taisuke: *See*—
Toda, Kunio; Yokoyama, Tomoaki; and Nagao, Taisuke, 5,036,369, Cl. 355-298.000.

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Hanai, Toshimichi; Nagashima, Hideyuki; and Fujita, Yasuyuki, 5,035,465, Cl. 297-238.000.

Nagashima, Makoto; Kobayashi, Naoaki; and Wong, Jerry, to Applied Materials, Inc. Cleaning method for semiconductor wafer processing apparatus. 5,035,751, Cl. 134-22.100.

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Watanabe, Shizuharu; Tani, Hiroji; and Nagata, Keisuke, 5,036,027, Cl. 501-96.000.

Nagata, Yoshikazu; and Nishimura, Yoshiyuki, to Petoca Ltd. Flexible materials for reflecting electromagnetic wave. 5,035,942, Cl. 428-288.000.

Nagayasu, Takayoshi: *See*—
Miyago, Makoto; Oka, Hiroshi; Imaya, Akihiko; Kato, Hiroaki; Nagayasu, Takayoshi; and Hirobe, Toshihiko, 5,036,370, Cl. 357-4.000.

Nagel, Thomas O., to Trion Industries Inc. Pre-assembled, two-part merchandise display hook. 5,035,388, Cl. 248-220.400.

Nageldinger, Edward L.: *See*—
Tveit, Gary L.; and Nageldinger, Edward L., 5,035,457, Cl. 294-86.004.

Nagle, Dennis C.: *See*—
Shepard, Donald F.; Fenolia, Robert J.; Nagle, Dennis C.; and Marousek, Michael E., 5,035,949, Cl. 428-337.000.

Naito, Masataka: *See*—
Hiroi, Masakazu; Naito, Masataka; Hayakawa, Kimiaki; Kobayashi, Kenji; and Mukasa, Mitsuhiro, 5,035,412, Cl. 270-053.000.

Naito, Takayuki: *See*—
Ohnuma, Takeshi; Obata, Rika; Kamei, Hideo; and Naito, Takayuki, 5,036,055, Cl. 514-27.000.

Najjar, Mitri S.: *See*—
Muan, Arnulf; and Najjar, Mitri S., 5,036,038, Cl. 502-335.000.

Nakada, Kazuhiko; Yasuda, Akihiro; and Ichikawa, Makoto, to Menicon Co., Ltd. Balloon for an intraocular lens and processes for its production. 5,035,710, Cl. 623-6.000.

Nakagaki, Shintaro: *See*—
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, 5,036,270, Cl. 324-96.000.

Nakai, Masaaki: *See*—
Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Nakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, 5,036,350, Cl. 354-475.000.

Nakajima, Keiji: *See*—
Sakaue, Yoshikazu; Sumi, Kazuhiko; and Nakajima, Keiji, 5,036,544, Cl. 382-24.000.

Nakajima, Sadaaki; and Terakawa, Taiju, to Chisso Corporation. Spinneret device for conjugate fibers of eccentric sheath-and-core type. 5,035,595, Cl. 425-131.500.

Nakajima, Tsunetaka; Okamoto, Tadao; Watanabe, Masahiro; and Yokoyama, Kazumasa, to Ishihara Sangyo Kaisha Ltd. Antiviral agent. 5,036,072, Cl. 514-274.000.

Nakamatsu, Shuji: *See*—
Nishiki, Yoshinori; Nakamatsu, Shuji; and Shimamune, Takayuki, 5,035,779, Cl. 204-98.000.

Nakamori, Yasutaka: *See*—
Yamada, Yasufumi; Nakamori, Yasutaka; Kozawa, Kiyomitsu; and Natsume, Yoshimi, 5,036,263, Cl. 318-116.000.

Nakamura, Hiroaki, to Shinko Denki Kabushiki Kaisha. Electromagnetic coupling device. 5,036,368, Cl. 335-272.000.

Nakamura, Hiroshi; and Kiuchi, Eiichi, to NEC Corporation. Pulse compressing apparatus for a radar system using a long pulse. 5,036,328, Cl. 342-204.000.
Nakamura, Masahiro: *See*—
Taga, Genji; Noritake, Masaki; Nakamura, Masahiro; and Zhang, Hua-Min, 5,036,030, Cl. 501-125.000.
Nakamura, Masayuki M. N.: *See*—
Kanto, Jumpei J. K.; Saito, Hitoshi H. S.; Eguchi, Hiroshi H. E.; and Nakamura, Masayuki M. N., 5,036,041, Cl. 503-227.000.
Nakamura, Mikio: *See*—
Yonese, Naoki; Nakamura, Mikio; Kawamura, Masato; and Takayama, Yukio, 5,035,954, Cl. 428-500.000.
Nakamura, Seizo, to Oki Electric Industry Co., Ltd. High-speed digital PLL device. 5,036,297, Cl. 331-17.000.
Nakamura, Takashi; and Kojima, Yasushi, to Fuji Photo Film Co., Ltd. Radiation image storage panel. 5,036,207, Cl. 250-484.100.
Nakamura, Takeaki: *See*—
Kubokawa, Hiroaki; Tsukaya, Takashi; Ueda, Yasuhiro; Ohshima, Yutaka; Nakamura, Takeaki; Hibino, Hiroki; Takayama, Shuichi; and Hagino, Tadao, 5,035,231, Cl. 128-6.000.
Nakamura, Taku: *See*—
Takahsshi, Ryuichi; and Nakamura, Taku, 5,035,975, Cl. 430-138.000.
Nakamura, Yasuhiro; Sakai, Ikuo; and Kawabuchi, Masami, to Matsushita Electric Industrial Co., Ltd. Ultrasonic Doppler blood flow velocity detection apparatus. 5,035,245, Cl. 128-661.090.
Nakamura, Yoshisada; Morigaki, Masakazu; Ishii, Yoshio; and Sakanoue, Kei, to Fuji Photo Film Co., Ltd. Silver halide photographic material containing a yellow coupler and a phosphorus compound and color image forming method. 5,035,988, Cl. 430-551.000.
Nakano, Yasushi: *See*—
Koyama, Noboru; Nakano, Yasushi; Yasufuku, Yoshitaka; Kawahara, Setsuko; Namiki, Takemasa; Kawabe, Shigetoshi; and Umemura, Masahiro, 5,035,856, Cl. 428-328.000.
Nakase, Koji: *See*—
Ouchi, Junichi; Nakase, Koji; and Sasaki, Hiroaki, 5,036,182, Cl. 235-462.000.
Ouchi, Junichi; Nakase, Koji; and Sasaki, Hiroaki, 5,036,183, Cl. 235-462.000.
Nakashima, Ryoichi: *See*—
Aizawa, Kooji; Nii, Katsutoshi; Kawaike, Kazuhiko; Hasegawa, Kengo; Saruta, Akira; and Nakashima, Ryoichi, 5,035,519, Cl. 384-121.000.
Nakata, Yutaka, to Ichikoh Industries, Ltd. Projector-type head lamp for motor vehicles. 5,036,438, Cl. 362-61.000.
Nakatani, Seiichi: *See*—
Yokotani, Yoichiro; Kagata, Hiroshi; Kato, Junichi; Nakatani, Seiichi; and Terada, Yukio, 5,036,424, Cl. 361-321.000.
Nakayama, Hiromichi: *See*—
Watanabe, Koji; Nakayama, Hiromichi; and Fukuhara, Kunihiro, 5,035,560, Cl. 411-508.000.
Nakayama, Hiroshi; Shimada, Hiroyuki; and Yumoto, Toshiyuki, to Honda Giken Kogyo Kabushiki Kaisha. Automotive transmission apparatus. 5,035,682, Cl. 475-66.000.
Nakayama, Kiyoshi: *See*—
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Nakayama, Yoshio: *See*—
Yamasaki, Kazuyuki; Yamamoto, Kimio; Watanabe, Masanobu; Kan, Kojiro; and Nakayama, Yoshio, 5,035,802, Cl. 210-440.000.
Nakayoshi, Kazumi: *See*—
Mine, Katsutoshi; Kogo, Akemi; Yamakawa, Kimio; and Nakayoshi, Kazumi, 5,036,024, Cl. 437-211.000.
Nakazato, Wataru; Muraoka, Kunihiko; Inaba, Shigemitsu; Ohtaka, Kazuto; and Takagishi, Takashi, to Yazaki Corporation; and Fuji Jukogyo Kabushiki Kaisha. Proper coupling confirming mechanism for an electric connector. 5,035,644, Cl. 439-372.000.
Nakazawa, Toru: *See*—
Ohnishi, Kazumasa; Nakazawa, Toru; and Manabe, Yukimitsu, 5,036,245, Cl. 310-323.000.
Nalco Chemical Company: *See*—
Fong, Dodd W.; and Hoots, John E., 5,035,806, Cl. 210-701.000.
Namiki, Takemasa: *See*—
Koyama, Noboru; Nakano, Yasushi; Yasufuku, Yoshitaka; Kawahara, Setsuko; Namiki, Takemasa; Kawabe, Shigetoshi; and Umemura, Masahiro, 5,035,856, Cl. 428-328.000.
Napier, Robert C.: *See*—
Finley, David A. J.; Carley, Peter M.; Stokes, James R.; and Napier, Robert C., 5,035,368, Cl. 241-212.000.
Narayanan, Kolazi S.: *See*—
Dougherty, James A.; Plotkin, Jeffrey S.; Vara, Fulvio J.; and Narayanan, Kolazi S., 5,036,112, Cl. 522-31.000.
Naritsuka, Shigeya: *See*—
Hatakoshi, Genichi; Itaya, Kazuhiko; Naritsuka, Shigeya; Ishikawa, Masayuki; Okuda, Hajime; Shiozawa, Hideo; Watanabe, Yukio; Ohba, Yasuo; Kokubun, Yoshihiro; and Uematsu, Yutaka, 5,036,521, Cl. 372-46.000.
Nartron Corporation: *See*—
Munch, Carl A.; Cooper, Stephen R. W.; and Rymut, Michael J., 5,036,275, Cl. 324-207.170.
Nastec, Inc.: *See*—
Anderson, William J.; and Bielskus, Algirdas, 5,035,153, Cl. 74-206.000.
Natalie, Kenneth J., Jr.: *See*—
Rzeszotarski, Wacław J.; Guzewska, Maria E.; McPherson, Daniel W.; Spagnuolo, Ciro J.; and Natalie, Kenneth J., Jr., 5,036,107, Cl. 514-648.000.
Nathasingh, Davidson M.; Martis, Ronald J. J.; and Datta, Amitava, to Allied-Signal Inc. Amorphous metal alloys having enhanced AC magnetic properties at elevated temperatures. 5,035,755, Cl. 148-304.000.
Natili, Franco: *See*—
Barillari, Piero; DeSanti, Pierluigi; Galderesi, Mario; Marchi, Carlo A.; Natili, Franco; Rossiello, Vincenzo; Settembre, Donato; and Urbinati, Francesco, 5,036,314, Cl. 340-717.000.
National Research Council of Canada: *See*—
Aussel, Jean-Daniel, 5,035,144, Cl. 73-602.000.
National Research Development Corporation: *See*—
Carter, Timothy J. N.; and Bunce, Roger A., 5,035,508, Cl. 356-416.000.
National Semiconductor Corporation: *See*—
Davis, Jeffrey B., 5,036,222, Cl. 307-443.000.
Wendell, Dennis L., 5,036,224, Cl. 307-475.000.
Wong, Hee, 5,036,525, Cl. 375-14.000.
National Starch and Chemical Investment Holding Corporation: *See*—
Lacourse, Norman L.; and Altieri, Paul A., 5,035,930, Cl. 428-35.600.
Natsuhara, Toshiya: *See*—
Enoguchi, Yuji; Natsuhara, Toshiya; and Mizuno, Hiroshi, 5,035,197, Cl. 118-647.000.
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Yamada, Yasufumi; Nakamori, Yasutaka; Kozawa, Kiyomitsu; and Natsume, Yoshimi, 5,036,263, Cl. 318-116.000.
Navistar International Transportation Corp.: *See*—
Mathews, Will W.; Serio, John A.; and Grinsteiner, James J., 5,035,637, Cl. 439-271.000.
NCR Corporation: *See*—
Tonnu, Thao T.; Suthar, Mukesh B.; and Kaseff, Charles A., 5,036,226, Cl. 307-475.000.
Nebe, William J.; and Osborne, James J., to Du Pont de Nemours, E. I., and Company. Photosensitive semi-aqueous developable gold conductor composition. 5,035,980, Cl. 430-281.000.
Nebesh, Eugene; Plundo, Robert A.; and McMahon, Steven L., to Engelhard Corporation. Hydrotreating catalyst and process. 5,035,793, Cl. 208-143.000.
NEC Corporation: *See*—
Hidaka, Yasuharu, 5,036,485, Cl. 365-29.000.
Kobayashi, Atsushi, 5,036,434, Cl. 361-540.000.
Matsumoto, Kouji, 5,036,225, Cl. 307-475.000.
Matsushima, Osamu; Maehashi, Yukio; Katori, Shigetatsu; Nomura, Masahiro; Shinohara, Hiroko; Kariya, Kohichi; and Abe, Mitsue, 5,036,458, Cl. 364-200.000.
Nakamura, Hiroshi; and Kiuchi, Eiichi, 5,036,328, Cl. 342-204.000.
Ono, Yuzo; Ohba, Akitomo; and Kimura, Yasuo, 5,036,504, Cl. 369-44.120.
Umezawa, Kazuhiko, 5,036,384, Cl. 357-82.000.
Yoshida, Shousei, 5,036,296, Cl. 331-17.000.
Neckers, Douglas C.: *See*—
Gottschalk, Peter; Neckers, Douglas C.; Schuster, Gary B.; Adair, Paul C.; and Pappas, S. Peter, 5,035,621, Cl. 433-226.000.
Nelson, H. Thomas: *See*—
Schrader, Gary E.; and Nelson, H. Thomas, 5,036,164, Cl. 174-94.00R.
Nelson, Thomas L., to Du Pont de Nemours, E. I., and Company. Nub yarn. 5,035,110, Cl. 57-208.000.
Nesbitt, Russell U.: *See*—
Apfel, Marilyn A.; Ghebre-Sellassie, Isaac; and Nesbitt, Russell U., 5,035,896, Cl. 424-456.000.
Song, Suk-Zu; Mehta, Surendra C.; Murthy, Kuchi S.; Nesbitt, Russell U.; and Fawzi, Mahdi B., 5,035,884, Cl. 424-78.000.
Nestec S.A.: *See*—
Persson, Tyko; Duc, Heribert; and Buhler, Marcel, 5,035,906, Cl. 426-285.000.
Neubecker, Karlheinz; Rohde, Cordt; and Welzig, Gerhard, to Degussa Aktiengesellschaft. Apparatus for controlling gas flows in vacuum furnaces. 5,035,611, Cl. 432-176.000.
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Dhyanchand, John J.; and Nguyen, Vietson M., 5,036,449, Cl. 363-15.000.
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Weihrich, Georg; Wohld, Dietrich; Niemann, Martin; and Jungkunz, Clemens, 5,036,265, Cl. 318-618.000.
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Kurosaki, Mutsuo, 5,035,455, Cl. 292-341.170.
Watanabe, Koji; Nakayama, Hiromichi; and Fukuhara, Kunihiro, 5,035,560, Cl. 411-508.000.
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Kanno, Nobumori; Ishii, Kunio; Takeda, Neiji; and Nihashi, Hiroyuki, 5,035,953, Cl. 428-484.000.
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Shiokawa, Kozo; Tsuboi, Shinichi; Sasaki, Shoko; Moriya, Koichi; Hattori, Yumi; and Shibuya, Katsuhiko, 5,036,082, Cl. 514-338.000.
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Niito, Yoshiharu, to Ricoh Company, Ltd. Toner end detection apparatus using ultrasonic sensor. 5,035,198, Cl. 118-653.000.
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Sasaki, Takashi; Kasumi, Takafumi; Kubo, Naoya; Kainuma, Keiji; Wako, Katsuo; Ishizuka, Hiroaki; Kawaguchi, Gaku; and Oda, Tsunero, 5,036,011, Cl. 435-255.000.
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Mori, Tamotsu; and Kikuchi, Katsuji, 5,035,016, Cl. 5-453.000.
Nikon Corporation: *See*—
Kusaka, Yosuke, 5,036,348, Cl. 354-402.000.
Nilsen, Martin J., to Illinois Tool Works, Inc. Anchoring device. 5,035,559, Cl. 411-508.000.
Nilssen, Ole K. Inverter power supply for incandescent lamp. 5,036,253, Cl. 315-151.000.
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Komuro, Mitsuo, 5,035,017, Cl. 5-481.000.
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Nishio, Hiroaki; and Kawashima, Takeshi, 5,035,847, Cl. 264-86.000.
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Fukuda, Toshio; and Kanashige, Masanori, 5,035,530, Cl. 403-404.000.
Nippon Oil and Fats Co., Ltd.: *See*—
Orikasa, Yuichi; and Sakazume, Suehiro, 5,036,120, Cl. 523-436.000.
Nippon Petrochemicals Co., Ltd.: *See*—
Orikasa, Yuichi; and Sakazume, Suehiro, 5,036,120, Cl. 523-436.000.
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Kimura, Kiyoshi; and Morita, Iwao, 5,036,059, Cl. 514-89.000.
Kimura, Kiyoshi; Kise, Masahiro; and Morita, Iwao, 5,036,098, Cl. 514-438.000.
Nippon Telegraph and Telephone Corp.: *See*—
Sonobe, Tadasi; Katane, Mamoru; Ikeguchi, Takashi; Matsumoto, Manabu; Ueda, Shinjiro; Kobari, Toshiaki; Takahashi, Takao; Hayasaka, Toa; and Kitayama, Toyoki, 5,036,290, Cl. 328-235.000.
Nippondenso Co., Ltd.: *See*—
Nishikawa, Seiichirou; and Kamai, Kenichiro, 5,035,226, Cl. 123-494.000.
Suzuki, Yoshio; and Hiramatsu, Michio, 5,035,052, Cl. 29-890.046.
Takeuchi, Kanji; Setaka, Yousuke; and Arita, Satoshi, 5,035,218, Cl. 123-361.000.
Yamada, Yasufumi; Nakamori, Yasutaka; Kozawa, Kiyomitsu; and Natsume, Yoshimi, 5,036,263, Cl. 318-116.000.
Yamane, Hiroyuki; and Higuchi, Yasushi, 5,036,019, Cl. 437-57.000.
Nirenberg, Morris; and Tucci, Jerry, to RASI Corporation. Button guide turning assembly. 5,035,192, Cl. 112-110.000.
Nishi, Kazuo: *See*—
Suzuki, Kunio; Abe, Masayoshi; Kinka, Mikio; Arai, Yasuyuki; Satake, Akemi; Nishi, Kazuo; Kugawa, Shuichi; and Ishida, Noriya, 5,035,753, Cl. 136-249.000.
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Nishikawa, Yukio; and Uesugi, Yuji, to Matsushita Electric Industrial Co., Ltd. Frequency fine-adjusting apparatus for a piezo-electric oscillator. 5,035,202, Cl. 118-727.000.
Nishiki, Yoshinori; Nakamatsu, Shuji; and Shimamune, Takayuki, to Permelec Electrode Ltd. Process for producing cathode and process for electrolysis using said cathode. 5,035,779, Cl. 204-98.000.
Nishimori, Kadotaro; Ito, Masazumi; Higashio, Kimihiko; and Kato, Akio, to Minolta Camera Kabushiki Kaisha. Copying apparatus including a stamping function and means for prohibiting the stamping function. 5,036,357, Cl. 355-202.000.
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Ishizuka, Koh; Nishimura, Tetsuharu; and Kasahara, Osamu, 5,036,192, Cl. 250-231.160.
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Nagata, Yoshikazu; and Nishimura, Yoshiyuki, 5,035,942, Cl. 428-288.000.
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Hanai, Toshimichi; Nagashima, Hideyuki; and Fujita, Yasuyuki, 5,035,465, Cl. 297-238.000.
Shibayama, Takashi, 5,035,159, Cl. 74-866.000.
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Voss, Hermann, 5,035,600, Cl. 425-161.000.
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Nishiguchi, Masanori; Sekiguchi, Takeshi; Miyoshi, Ikkei; and Nishio, Kiyoshi, 5,035,087, Cl. 51-131.100.
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Asano, Osamu; Shoji, Michihiro; and Kowada, Masunari, 5,035,549, Cl. 408-132.000.
Shoji, Michihiro, 5,035,547, Cl. 408-6.000.
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Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Nakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, 5,036,350, Cl. 354-475.000.
NKK Corporation: *See*—
Sakiyama, Tetsuo; Tsuyama, Seishi; and Minakawa, Kuninori, 5,035,754, Cl. 148-159.000.
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Schmid, Herman, 5,035,843, Cl. 264-3.200.
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Harashima, Noboru; Mimura, Kazuhiro; Sasaki, Yosuke; Okubo, Hideaki; Nogawa, Makoto; and Fujimoto, Satoshi, 5,035,599, Cl. 425-150.000.
Noguchi, Kouki; Akizawa, Mitsuru; and Kato, Kanji, to Hitachi, Ltd; and Hitachi Maxell, Ltd. Associative memory device. 5,036,486, Cl. 365-49.000.
Noguchi, Masahiro: *See*—
Tamura, Koji; Kashiwagi, Hiroshi; and Noguchi, Masahiro, 5,035,823, Cl. 252-67.000.
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Takita, Nagon; and Noguchi, Yoshihiro, 5,035,175, Cl. 101-116.000.
Nojima Keikinzoku Co., Ltd.: *See*—
Nojima, Norihiro, 5,035,367, Cl. 241-37.500.

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NOK Corporation: *See—*
Kawase, Ritsuo, 5,035,272, Cl. 141-312.000.

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Uronen, Lasse J.; and Saarela, Matti J., 5,036,432, Cl. 361-422.000.

Nomura, Masahiro: *See—*
Matsushima, Osamu; Maehashi, Yukio; Katori, Shigetatsu; Nomura, Masahiro; Shinohara, Hiroko; Kariya, Kohichi; and Abe, Mitsue, 5,036,458, Cl. 364-200.000.

Noritake Co., Limited: *See—*
Yoshikawa, Nobuyoshi; and Asano, Hiroshi, 5,035,850, Cl. 264-256.000.

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Taga, Genji; Noritake, Masaki; Nakamura, Masahiro; and Zhang, Hua-Min, 5,036,030, Cl. 501-125.000.

Norman, Marvin N.; Smith, Lawrence E.; and Knight, Peter R., to Thomson Consumer Electronics, Inc. Projection TV deflection loss protection circuit. 5,036,257, Cl. 315-381.000.

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Tamura, Yutaka; Hosokawa, Yoshio; Noro, Satoshi; and Kondo, Kazuhiko, 5,036,471, Cl. 364-449.000.

Norsworthy, John A., to Unique-Quality Products, Inc. Power distribution system. 5,035,630, Cl. 439-92.000.

North American Cylinders: *See—*
Rabren, Michael S., 5,035,774, Cl. 202-164.000.

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Dias, Maureen E., 5,035,019, Cl. 10-152.00T.

North, Brian, to Wiggins Teape Group Limited, The. Process for the production of microcapsules. 5,035,844, Cl. 264-4.330.

Northern Telecom Limited: *See—*
Kalnitsky, Alexander; Ellul, Joseph P.; and Boothroyd, Albert R., 5,035,916, Cl. 427-38.000.
McNicol, John D.; and Jemczyk, Iwan D., 5,036,526, Cl. 375-39.000.

Norton Company: *See—*
Kalinowski, Paul W.; Ramakrishnan, Muni S.; Rue, Charles V.; Sheldon, David A.; and Swanson, Brian E., 5,035,723, Cl. 51-309.000.
Pukari, Vimal K.; Paille, Norman I., Jr.; Thibaudeau, Thomas P.; and Khaund, Arup K., 5,035,724, Cl. 51-309.000.

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Piorunneck, Heinz; Noschese, Rocco J.; and Ramirez, Fernando J., 5,035,631, Cl. 439-108.000.

Novick, Carl A. Hot sleeve, and methods of constructing and utilizing same. 5,035,001, Cl. 2-125.000.

Noville, Jean-Francois L.; and Wilmotte, Stephan H., to Centre de Recherches Metallurgiques-Centrum Voor Research in de Metallurgie. Apparatus for cooling a cylindrical member in linear motion. 5,035,403, Cl. 266-114.000.

Novo-Nordisk A/S: *See—*
Hastrup, Sven, 5,036,002, Cl. 435-69.100.

Noxon, Arthur M. Wall attached sound absorptive structure. 5,035,298, Cl. 181-295.000.

Nozaki, Masahiro, to Toyoda Gosei Co., Ltd. Weather strip. 5,035,937, Cl. 428-122.000.

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Glaser, Edward L.; DesJardins, Paul R.; Caldwell, Douglas W.; and Glaser, Eliot D., 5,036,457, Cl. 364-200.000.

Nugent, James E.: *See—*
Settlemier, Brock R.; Bone, Steven R.; Tolivaisa, John; and Nugent, James E., 5,035,395, Cl. 248-634.000.

Nutting, Donald W. Cardboard coffin. 5,035,032, Cl. 27-4.000.

N.V. Nederlandsche Apparatenfabriek Nedap: *See—*
Fockens, Tallienco W. H., 5,036,308, Cl. 340-572.000.

N.V. Philips' Gloeilampenfabrieken: *See—*
Bergmans, Johannes W. M.; Mita, Seiichi; Izumita, Morishi; and Doi, Nobukazu, 5,036,524, Cl. 375-12.000.

Nyfeler, Robert: *See—*
Tobler, Hans; Ackermann, Peter; and Nyfeler, Robert, 5,036,084, Cl. 514-355.000.

Obara Corporation: *See—*
Umeda, Shigeru, 5,036,175, Cl. 219-89.000.

Obata, Rika: *See—*
Ohnuma, Takeshi; Obata, Rika; Kamei, Hideo; and Naito, Takayuki, 5,036,055, Cl. 514-27.000.

Obrecht, Werner; Szentivanyi, Szolt; Sutter, Hubert; Herwig, Jens; and Kolwert, Alois, to Bayer Aktiengesellschaft. Process for the preparation of ethylene/acrylonitrile copolymers, new ethylene/acrylonitrile copolymers and their use. 5,036,149, Cl. 526-323.200.

O'Brien, Edwin L., to Hughes Aircraft Company. Doppler determination system for MTI radars. 5,036,325, Cl. 342-160.000.

Occelli, Mario L., to Union Oil Company of California. Catalyst composition containing a crystalline galliosilicate having the zeolite L type structure. 5,035,868, Cl. 423-326.000.

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Duijve, Johan A.; and Velraeds, Gijsbertus, 5,036,359, Cl. 355-203.000.

O'Connell, James A.: *See—*
Elliott, John C.; O'Connell, James A.; Ladouceur, Lawrence; Altman, William; and Jarett, Keith, 5,036,461, Cl. 364-408.000.

O'Connell, Robert M.: *See—*
Thomas, David A.; O'Connell, Robert M.; Reinert, Robert C.; and Gillin, John M., 5,035,935, Cl. 428-43.000.

Oda, Tsunero: *See—*
Sasaki, Takashi; Kasumi, Takafumi; Kubo, Naoya; Kainuma, Keiji; Wako, Katsuo; Ishizuka, Hiroaki; Kawaguchi, Gaku; and Oda, Tsunero, 5,036,011, Cl. 435-255.000.

Odaka, Hiroyuki: *See—*
Matsuo, Takao; Odaka, Hiroyuki; Suzuki, Tsuyoshi; and Tsuda, Masao, 5,036,081, Cl. 514-336.000.

Odenwalder, Heinrich; Kruger, Thomas; and Schumann, Hans-Joachim, to Agfa Gevaert Aktiengesellschaft. Color photographic recording material containing a DIR coupler. 5,035,987, Cl. 430-544.000.

Ogawa, Hiroshi: *See—*
Saito, Shinji; and Ogawa, Hiroshi, 5,035,948, Cl. 428-329.000.

Ogawa, Kazufumi: *See—*
Tamura, Hideharu; and Ogawa, Kazufumi, 5,035,782, Cl. 204-157.600.

Ogawa, Kazuo; and Matsushita, Yoh-ichi, to Taiho Pharmaceutical Company, Limited. Benzothiadiazepine derivatives. 5,036,065, Cl. 514-211.000.

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Suzuki, Teruo; Ogawa, Kenichi; and Murakami, Hiroshi, 5,035,780, Cl. 204-129.350.

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Ogawa, Motosuke; Fukazawa, Hiromitsu; and Ogawa, Yasumasa, 5,035,833, Cl. 252-182.240.

Ohba, Akitomo: *See—*
Ono, Yuzo; Ohba, Akitomo; and Kimura, Yasuo, 5,036,504, Cl. 369-44.120.

Ohba, Yasuo: *See—*
Hatakoshi, Genichi; Itaya, Kazuhiko; Naritsuka, Shigeya; Ishikawa, Masayuki; Okuda, Hajime; Shiozawa, Hideo; Watanabe, Yukio; Ohba, Yasuo; Kokubun, Yoshihiro; and Uematsu, Yutaka, 5,036,521, Cl. 372-46.000.

Ohi Seisakusho Co., Ltd.: *See—*
Kato, Yuichi; Yoshida, Hiroshi; and Mizusawa, Kozo, 5,035,463, Cl. 296-223.000.

Ohio Medical Instrument Co., Inc.: *See—*
Comparetto, John E., 5,035,698, Cl. 606-82.000.

Ohishi, Toshiyuki; Abe, Yuji; Sugimoto, Hiroshi; Ohisuka, Ken-ichi; and Matsui, Teruhito, to Mitsubishi Denki Kabushiki Kaisha. Heterojunction avalanche transistor. 5,036,372, Cl. 357-16.000.

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Ohishi, Toshiyuki; Abe, Yuji; Sugimoto, Hiroshi; Ohisuka, Ken-ichi; and Matsui, Teruhito, 5,036,372, Cl. 357-16.000.

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Tada, Masuo; Hata, Takeki; Fukumoto, Takaaki; and Ohmori, Toshiaki, 5,035,750, Cl. 134-7.000.

Ohnishi, Hiroshi: *See—*
Ichikawa, Yasunori; Ohnishi, Hiroshi; Urabe, Shigeharu; Kojima, Akira; and Katoh, Akira, 5,035,991, Cl. 430-569.000.

Ohnishi, Kazumasa; Nakazawa, Toru; and Manabe, Yukimitsu, to Alps Electric Co., Ltd. Ultrasonic linear motor. 5,036,245, Cl. 310-323.000.

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Adachi, Keiichi; Ohno, Shigeru; and Waki, Kokichi, 5,035,985, Cl. 430-432.000.
Sakai, Nobuo; and Ohno, Shigeru, 5,035,986, Cl. 430-522.000.

Ohnuki, Masayoshi: *See—*
Tanaka, Shoji; Yamauchi, Hisao; Yamada, Yukio; Ohnuki, Masayoshi; Morita, Etsuji; Toyoshima, Mitsunobu; Wada, Yasuo; Hinoshita, Hirotaka; Ikeda, Wataru; Aihara, Etsuji; Kobayashi, Tutomu; and Suguro, Kuniaki, 5,035,597, Cl. 425-135.000.

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Shibusawa, Koichi; and Ohsawa, Shigemitsu, 5,035,895, Cl. 424-450.000.

Ohshima, Yutaka: *See—*
Kubokawa, Hiroaki; Tsukaya, Takashi; Ueda, Yasuhiro; Ohshima, Yutaka; Nakamura, Takeaki; Hibino, Hiroki; Takayama, Shuichi; and Hagino, Tadao, 5,035,231, Cl. 128-6.000.

Ohst, Holger; Meier, Helmut-Martin; and Kircher, Klaus, to Bayer Aktiengesellschaft. Mold releasel agents for poly(ester) carbonates. 5,036,151, Cl. 524-101.000.

Ohtaka, Kazuto: *See—*
Nakazato, Wataru; Muraoka, Kunihiko; Inaba, Shigemitsu; Ohtaka, Kazuto; and Takagishi, Takashi, 5,035,644, Cl. 439-372.000.

Ohtake, Shinichi; and Tamura, Tatsuya, to Hashimoto Forming Industry Co., Ltd. Synthetic resin window for automotive vehicles or the like. 5,035,096, Cl. 52-208.000.

Ohuchi, Hirofumi, to Mitsubishi Denki K.K. Engine revolution control apparatus for vehicle. 5,035,215, Cl. 123-339.000.

Oikawa, Kiyoharu: *See*—
Sakai, Hideo; Oikawa, Kiyoharu; and Saito, Tomotaka, 5,036,223, Cl. 307-448.000.
Ojima, Juji, to NHK Spring Co., Ltd. Belt or chain tensioner for power transmitting system. 5,035,680, Cl. 474-138.000.
Oka, Hiroshi: *See*—
Miyago, Makoto; Oka, Hiroshi; Imaya, Akihiko; Kato, Hiroaki; Nagayasu, Takayoshi; and Hirobe, Toshihiko, 5,036,370, Cl. 357-4.000.
Okada, Kazuhiro, to Wacoh Corporation. Force detector using resistance elements. 5,035,148, Cl. 73-862.040.
Okada, Masako: *See*—
Kozaki, Shyuichi; Okada, Masako; Funada, Fumiaki; Sasaki, Kei; Saito, Hideo; and Takeshita, Fusayuki, 5,035,928, Cl. 428-1.000.
Okada, Mitsuyuki: *See*—
Toyoshima, Yoshiki; Okada, Mitsuyuki; Fujii, Takeshi; Yamaguchi, Kentaro; and Tsuji, Mitsuji, 5,036,141, Cl. 525-286.000.
Okada, Susumu: *See*—
Saeki, Shuji; Suehiro, Masatoshi; Echigo, Masashi; Okada, Susumu; and Sakuraba, Masami, 5,035,837, Cl. 252-512.000.
Okada, Takao: *See*—
Kajimura, Hiroshi; and Okada, Takao, 5,036,490, Cl. 365-151.000.
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Okano, Takashi, to Pioneer Electronic Corporation. Spindle servo unit for disk playing device. 5,036,508, Cl. 369-50.000.
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Floyd, Robert A.; and Carney, John M., 5,036,097, Cl. 514-400.000.
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Okuda, Hajime: *See*—
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Reich, Robert R.; and Olesen, Jan, 5,035,674, Cl. 452-169.000.
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Quackenbush, Allen B.; and Rigsby, James G., 5,035,775, Cl. 203-12.000.
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More, James R.; Olsen, Arnold T.; and Young, John S., 5,035,766, Cl. 156-581.000.
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Purcell, Nick L.; Schmidt, Joseph A.; and O'Malley, John A., 5,035,180, Cl. 102-481.000.
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Lamotte, Lionel; Mirey, Jean-Claude; Omiel, Jean; and Gaquere, Jean-Pierre, 5,035,556, Cl. 409-218.000.
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Tamura, Kohji; Omure, Yukio; and Ide, Satoshi, 5,035,828, Cl. 252-170.000.
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Ozaki, Masaru; and Ona, Isao, 5,036,123, Cl. 524-267.000.
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Allen, Douglas J. M.; and O'Neill, Brian T., 5,036,099, Cl. 514-414.000.
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Ooka, Sinkiti: *See*—
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Opex Corporation: *See*—
Lile, William R.; and Lange, Russell M., 5,036,190, Cl. 250-223.00R.
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Frohlich, Alfons; and Probst, Anton, 5,035,125, Cl. 66-193.000.
Orbach, Israel. Heater unit for heating container for moist tissues. 5,036,178, Cl. 219-385.000.
Ordev B.V.: *See*—
Hoffman, Erik L., 5,035,712, Cl. 623-16.000.
Orikasa, Yuichi; and Sakazume, Suehiro, to Nippon Petrochemicals Co., Ltd.; and Nippon Oil and Fats Co., Ltd. Thermoplastic resin composition and method for preparing the same. 5,036,120, Cl. 523-436.000.
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Orogil: *See*—
Leone, Savino, 5,035,816, Cl. 252-40.500.
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Welch, Alan B.; Skinner, Raymond C. D.; and Goetz, Wendelin A., 5,035,206, Cl. 123-27.0GE.
Orth, Jean C.: *See*—
Kasprzyk, Daniel J.; Orth, Jean C.; and Gaiser, John W., 5,035,694, Cl. 606-27.000.
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Friis, Elizabeth A., 5,035,713, Cl. 623-16.000.
Oryz Energy Company: *See*—
Cayias, John L.; Holley, Susan M.; and Lichtenberger, Gunter J., 5,035,287, Cl. 166-250.000.
Osborne, James J.: *See*—
Nebe, William J.; and Osborne, James J., 5,035,980, Cl. 430-281.000.
Osborne, Thomas A.: *See*—
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Osborne, William S., to Hewlett-Packard Company. Piezoelectric detector for drop position determination in multi-pen ink jet printing systems. 5,036,340, Cl. 346-140.00R.
Osteen, Mitchell M., to General Electric Company. Means and method for controlling the uplighting properties of a luminaire having a reflector of substantially transparent material with a prismatic outer surface. 5,036,445, Cl. 362-348.000.
Oster, Gerald; and Davis, Baruch J. Redox polymerization diagnostic test composition and method for immunoassay and nuclei acid assay. 5,035,997, Cl. 435-6.000.
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Chapelain, Jean-Claude; and Beaulieu, Daniel, 5,035,300, Cl. 187-1.00R.
Leach, Robert B.; Slabinski, Chester J.; and Youla, Jean, 5,036,321, Cl. 341-33.000.
Skalski, Clement A., 5,035,301, Cl. 187-118.000.
Thangavelu, Kandasamy, 5,035,302, Cl. 187-125.000.
Ouchi, Junichi; Nakase, Koji; and Sasaki, Hiroaki, to Alps Electric Co., Ltd. Bar code reading and decoding apparatus. 5,036,182, Cl. 235-462.000.
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Ouhayoun, Michel M., to SAT (Societe Anonyme de Telecommunications). Coherent detection with increased sensitivity using four-wave amplification. 5,035,506, Cl. 356-349.000.
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Bland, Gerald F.; Mondek, Martin J.; and Zdanowicz, Lawrence E., 5,035,663, Cl. 440-75.000.
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Mate, David W.; Rogers, Duane E.; Billingsley, Henry C.; Broughton, George L.; and Belec, Glenn R., 5,035,211, Cl. 123-198.00E.
Woodward, Lee A., 5,035,437, Cl. 280-40.000.

Ove Larsson Production AB: *See*—
Larsson, Ove, 5,036,341, Cl. 346-154.000.

Oy Nokia Ab: *See*—
Honkanen, Seppo; Tammela, Simo; and Tervonen, Ari, 5,035,734, Cl. 65-30.130.

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Ozawa, Susumu: *See*—
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Ozeki, Kohji; Tsukamoto, Yoshitsugu; Yaginuma, Hideya; and Sato, Makoto, to Morishita Pharmaceutical Co., Ltd.; and Ajinomoto Co., Inc. Amino acid nutrient compositions. 5,036,052, Cl. 514-19.000.

Pace, Herbert W.: *See*—
Wally, Joseph H., Jr.; Elkins, Arlen C.; Halsey, Ron L.; and Pace, Herbert W., 5,036,355, Cl. 355-75.000.

Pacheco, LeRoy R. Barbecue grill cleaner bag. 5,035,516, Cl. 383-41.000.

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Walasek, Steven P.; and Walasek, Stuart J., 5,035,241, Cl. 128-403.000.

Padrta, Frank G.: *See*—
Foutsitzis, Arthur A.; Padrta, Frank G.; and Russ, Michael B., 5,035,792, Cl. 208-138.000.

Page, Loretta Ann G.: *See*—
El-Sayed, Lyla M.; and Page, Loretta Ann G., 5,035,972, Cl. 430-114.000.

Page, Robert L. G.; and Honan, William J., to Hynbrood Pty. Limited. Utility vehicle chassis having a vertically adjustable bed. 5,035,462, Cl. 296-183.000.

Pagliarini, John A., Jr. Method for reducing hazards due to low frequency electric and magnetic fields. 5,036,177, Cl. 219-212.000.

Pailhes, Alain: *See*—
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Paille, Norman I., Jr.: *See*—
Pukari, Vimal K.; Paille, Norman I., Jr.; Thibaudeau, Thomas P.; and Khaund, Arup K., 5,035,724, Cl. 51-309.000.

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Hsieh, Bing R.; Gruber, Robert J.; Moffat, Karen A.; Mychajlowskij, Walter; and Paine, Anthony J., 5,035,970, Cl. 430-109.000.

Palmer, John L.; and Timmerman, Marsha W., to Enzymatics, Inc. Threshold color control system. 5,036,000, Cl. 435-26.000.

Palmer, Sharon-Joy. Apparatus and method for improved plant growth. 5,035,077, Cl. 47-17.000.

Panetta, Patrick F.: *See*—
DiGiovanna, Leonard D.; and Panetta, Patrick F., 5,036,530, Cl. 378-208.000.

Panlaqui, Clayton E.: *See*—
Jacks, Donald J.; Panlaqui, Clayton E.; Boss, Raymond E.; and Gaunt, Edwin, 5,035,181, Cl. 102-481.000.

Papallo, Thomas F., Jr.; and Castonguay, Roger N., to General Electric Company. Bell alarm accessory arrangement for molded case circuit interrupter. 5,036,303, Cl. 335-17.000.

Pappas, S. Peter: *See*—
Gottschalk, Peter; Neckers, Douglas C.; Schuster, Gary B.; Adair, Paul C.; and Pappas, S. Peter, 5,035,621, Cl. 433-226.000.

Parazader, Stephen; and Carr, Don F., to Blenkhorn and Sawle Limited, a part interest. Building structure with fixed center and movable perimeter roof sections. 5,035,093, Cl. 52-64.000.

Parent, Edward D.; and Smith, Oliver S., to GTE Products Corporation. Evaporating boat having parallel inclined cavities. 5,035,201, Cl. 118-726.000.

Park Plus Corporation: *See*—
Rosen, Arnold M., 5,035,562, Cl. 414-240.000.

Parker, Andrew: *See*—
Bradbury, Timothy; and Parker, Andrew, 5,035,061, Cl. 33-430.000.

Parker Hannifin Corporation: *See*—
Hodgkins, David H., 5,035,729, Cl. 55-168.000.

Parker, Martin: *See*—
Ehrenfels, Alfred L.; Lutz, David; and Parker, Martin, 5,035,646, Cl. 439-536.000.

Parker, Norman W.; Robinson, William P.; and Piccioni, Robert L., to MicroBeam, Inc. Method for repairing semiconductor masks and reticles. 5,035,787, Cl. 204-192.340.

Parkinson, Martin C. Method and apparatus using molecular sieves for freeze drying. 5,035,065, Cl. 34-92.000.

Parrain, Gilbert: *See*—
Senneron, Michel; Parrain, Gilbert; Rabilloud, Guy; and Sillion, Bernard, 5,036,111, Cl. 521-182.000.

Parren, Joseph R. Safety locking device. 5,035,608, Cl. 431-153.000.

Patel, Bhakti S.: *See*—
Huber, James V.; Patel, Bhakti S.; and Tikhtman, Jacob, 5,036,242, Cl. 313-35.000.

Patel, Kanti D., to Du Pont de Nemours, E. I., and Company. Connector, circuit board contact element and retention portion. 5,035,656, Cl. 439-733.000.

Patel, Milan: *See*—
McEwan, Vince; and Patel, Milan, 5,036,248, Cl. 313-500.000.

Patel, Vijay B.: *See*—
Maitra, Kalyan K.; and Patel, Vijay B., 5,035,042, Cl. 29-527.400.

Pathak, Vijay K.; and Cotton, David R., to Texas Instruments Incorporated. Triac array. 5,036,377, Cl. 357-38.000.

Paton, A. David: *See*—
Michaelis, A. John; and Paton, A. David, 5,036,241, Cl. 310-358.000.

Patt, William C.: *See*—
Himmelsbach, Richard; Hodges, John C.; Kaltenbronn, James S.; Patt, William C.; Repine, Joseph T.; and Sircar, Ila, 5,036,053, Cl. 514-19.000.

Patterson, James A. Metal plated microsphere catalyst. 5,036,031, Cl. 502-10.000.

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Tillman, William R.; and Pauli, Robert A., 5,035,089, Cl. 51-425.000.

Pauli, Robert A.: *See*—
Tillman, William R.; and Pauli, Robert A., 5,035,089, Cl. 51-425.000.

Paulson, Jerome I. Method and apparatus for removing dust and debris from particulate product. 5,035,331, Cl. 209-3.000.

Pavlisko, Joseph A.: *See*—
Chen, Tsang J.; Nielsen, Paul L.; and Pavlisko, Joseph A., 5,035,927, Cl. 427-444.000.

Pavlu, Milos: *See*—
Beran, Jaroslav; Pavlu, Milos; Prasil, Vladimir; Holy, Zdenek; Pesek, Frantisek; Vitamvas, Zdenek; and Vitak, Josef, 5,035,369, Cl. 242-18.0DD.

Pawlik, James A., to GTE Valenite Corporation. Radiused on-edge indexable cutting insert. 5,035,546, Cl. 407-116.000.

Paxon, James F.; and Schommer, Duane J., to Eastman Kodak Company. Moisture compensation for electrostatographic apparatus. 5,036,360, Cl. 355-208.000.

Pearce, Frank G., to Powerpak Lures, Inc. Fishing lure. 5,035,075, Cl. 43-26.200.

Peiffer, Dennis G., to Exxon Research and Engineering Company. Mixtures of colloidal rod-like viscoelastic fluids and anionic-alkyl containing copolymers. 5,036,136, Cl. 524-812.000.

Pellari, Riccardo. Apparatus for controlling and straightening weft and/or warp fabric patterns. 5,035,030, Cl. 26-51.500.

Pelton, Scott L., to Boeing Company, The. Pitch attitude command flight control system for landing flare. 5,036,469, Cl. 364-428.000.

Pendrick, Valerie A.: *See*—
Conlon, Edward J.; Prabhu, Ashok N.; Boardman, Simon M.; and Pendrick, Valerie A., 5,035,939, Cl. 428-137.000.

Pepin, Gregory P.: *See*—
Davis, Lorne A., Jr.; Hart, Timothy J.; Moss, Robert M.; and Pepin, Gregory P., 5,036,193, Cl. 250-255.000.

Perla, Dennis A.: *See*—
Bachynsky, Maria O.; Infeld, Martin H.; Margolis, Richard J.; and Perla, Dennis A., 5,036,102, Cl. 514-455.000.

Permelec Electrode Ltd.: *See*—
Nishiki, Yoshinori; Nakamatsu, Shuji; and Shimamune, Takayuki, 5,035,779, Cl. 204-98.000.

Perrigo, Michael C., to John Brown, Inc. Constant contact lay-on roll winder. 5,035,373, Cl. 242-56.00A.

Perrin, Patrice, to Rhone-Poulenc Chimie. Single-component, storage-stable organopolysiloxanes crosslinkable into elastomeric state. 5,036,125, Cl. 524-405.000.

Perron, Claude: *See*—
Auvray, Eric; and Perron, Claude, 5,036,391, Cl. 358-133.000.

Pershinske, James E., to Gregor Jonsson Associates, Inc. Cutter height adjustment means. 5,035,670, Cl. 452-5.000.

Persing, Brian J., to Westinghouse Electric Corp. Markerboard. 5,035,626, Cl. 434-408.000.

Persson, Tyko; Duc, Heribert; and Buhler, Marcel, to Nestec S.A. Biscuit and process of preparation. 5,035,906, Cl. 426-285.000.

Pesata, Patrick J., Jr.: *See*—
Boon, Wyndham H.; Gartland, Robert J.; and Pesata, Patrick J., Jr., 5,036,113, Cl. 522-96.000.

Pesek, Frantisek: *See*—
Beran, Jaroslav; Pavlu, Milos; Prasil, Vladimir; Holy, Zdenek; Pesek, Frantisek; Vitamvas, Zdenek; and Vitak, Josef, 5,035,369, Cl. 242-18.0DD.

Pessers, Wilhelmus A. R. M.: *See*—
Bruinink, Peter; and Pessers, Wilhelmus A. R. M., 5,035,952, Cl. 428-461.000.

Peters, Donald L.: *See*—
Rathman, John R.; and Peters, Donald L., 5,035,604, Cl. 425-525.000.

Peterson, Bruce A., to Molex Incorporated. Compliant terminal pin. 5,035,659, Cl. 439-751.000.

Peterson, Roger A.: *See*—
Neuenfeldt, Douglas L.; and Peterson, Roger A., 5,035,281, Cl. 165-76.000.

Peterson, Scott M., to Honeywell Inc. Fuel burner having an intermittent pilot with pre-ignition testing. 5,035,607, Cl. 431-46.000.

Petersson, Nils, to Hultberg, Leif. Device for turning a load. 5,035,570, Cl. 414-778.000.

Petoca Ltd.: *See—*
Nagata, Yoshikazu; and Nishimura, Yoshiyuki, 5,035,942, Cl. 428-288.000.

Petrillo, Patrick G. Method and means for providing rear steerability in a trailer assembly. 5,035,439, Cl. 280-81.600.

Petrolite Corporation: *See—*
Weers, Jerry J., 5,035,720, Cl. 44-343.000.

Petrolphysics Operators: *See—*
Dickinson, Ben W. O.; Anderson, Randall R.; Dickinson, Robert W.; Dickinson, Eric W.; and Dykstra, Herman, 5,035,285, Cl. 166-65.100.

Petrov, Vyacheslav V.: *See—*
Antonov, Alexandr A.; Petrov, Vyacheslav V.; and Antonova, Olga I., 5,036,401, Cl. 358-242.000.

Peukert, Doris: *See—*
Fehrenbach, Gustav W.; and Peukert, Doris, 5,035,513, Cl. 374-161.000.

Peyronel, Jean-Francois: *See—*
Comte, Marie-Therese; Gueremy, Claude; Malleron, Jean-Luc; Mignani, Serge; Peyronel, Jean-Francois; and Truchon, Alain, 5,036,075, Cl. 514-293.000.

Pfahl, Kurt A.: *See—*
Buckley, Stephen P.; Robinson, Richard A.; Hurlburt, John H.; Pfahl, Kurt A.; and Doerflinger, Arthur E., 5,036,472, Cl. 364-479.000.

Pfalzgraf, Manfred; Hickmann, Gerd; and Mausner, Eberhard, to VDO Adolf Schindling AG. Load-shifting device. 5,035,213, Cl. 123-336.000.

Pfister, Juergen: *See—*
Hagen, Helmut; Pfister, Juergen; Eichenauer, Ulrich; Wuerzer, Bruno; Helbig, Wilfried; and Westphalen, Karl-Otto, 5,035,736, Cl. 71-98.000.

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Kenna, Robert V., 5,035,700, Cl. 606-88.000.

Pfizer Inc.: *See—*
Allen, Douglas J. M.; and O'Neill, Brian T., 5,036,099, Cl. 514-414.000.
Clark, David A.; Goldstein, Steven W.; and Hulin, Bernard, 5,036,079, Cl. 514-333.000.
Danilewicz, John C.; and James, Keith, 5,036,104, Cl. 514-513.000.
Dugger, Robert W., 5,036,155, Cl. 560-39.000.
Kitaura, Yoshihiko; Ito, Fumitaka; Stevens, Rodney W.; and Asai, Nobuko, 5,036,088, Cl. 514-375.000.

Pharlyse S.A. Societe Anonyme: *See—*
Deboeck, Arthur M.; Baudier, Philippe R.; Fossion, Jacques J.; and Maes, Paul J., 5,036,100, Cl. 514-420.000.

Pharmacia AB: *See—*
Hansen, Bertil V.; Gunnarsson, Per-Olov G.; Mollberg, Henri R.; and Johansson, Sven-Åke, 5,036,062, Cl. 514-176.000.

Philip Morris, Inc.: *See—*
Leyden, Donald E., 5,036,204, Cl. 250-373.000.
Thomas, David A.; O'Connell, Robert M.; Reinert, Robert C.; and Gillin, John M., 5,035,935, Cl. 428-43.000.

Philip Morris Management Corp.: *See—*
Spruill, David B.; Banyasz, Joseph L.; and Van Auken, Thomas V., 5,035,731, Cl. 55-387.000.

Phillip Morris Incorporated: *See—*
Tomanovits, John, 5,035,102, Cl. 53-397.000.

Phillips, Charles A.; and Phillips, Mortimer D., to Leonard Baking Co., Inc. Method of making and using an assembly for decorating pastries. 5,035,907, Cl. 426-383.000.

Phillips, Mortimer D.: *See—*
Phillips, Charles A.; and Phillips, Mortimer D., 5,035,907, Cl. 426-383.000.

Phillips Petroleum Company: *See—*
Rathman, John R.; and Peters, Donald L., 5,035,604, Cl. 425-525.000.
Snell, James B.; and Skinner, Marjorie B., 5,035,932, Cl. 428-36.400.

Phoenix Lighting Products Corporation: *See—*
Hesse, Louis D., 5,035,655, Cl. 439-699.000.

Phoenix, Norman E.: *See—*
Sutton, Leroy A.; and Phoenix, Norman E., 5,036,259, Cl. 315-382.000.

Photoprotective Technologies, Inc.: *See—*
Gallas, James M., 5,036,115, Cl. 523-106.000.

Piana, Ivana; and Piana, Silvano, to Grafoplast S.p.A. Automatic marking machine for the introduction of ring-shaped marking elements into recessed supports. 5,035,048, Cl. 29-809.000.

Piana, Silvano: *See—*
Piana, Ivana; and Piana, Silvano, 5,035,048, Cl. 29-809.000.

Piccioni, Robert L.: *See—*
Parker, Norman W.; Robinson, William P.; and Piccioni, Robert L., 5,035,787, Cl. 204-192.340.

Picciriello, Matteo: *See—*
Vittone, Oreste; and Picciriello, Matteo, 5,035,642, Cl. 439-350.000.

Picker International, Inc.: *See—*
Morich, Michael A.; Martens, Michael A.; and Brown, Robert W., 5,036,282, Cl. 324-318.000.

Pidgeon, Joseph A. Hole saw driver and extruder. 5,035,548, Cl. 408-68.000.

Pieper, Helmut; Zschocher, Hartmut; and Sorg, Helmut, to Beteiligungen Sorg GmbH & Co. KG. Process for vitrifying environmentally hazardous waste material in a glass melting furnace. 5,035,735, Cl. 65-134.000.

Pierce, Byron C.: *See—*
Carter, Howard E.; Pugh, Joel A.; and Pierce, Byron C., 5,036,533, Cl. 379-59.000.

Pierre Guerin S.A.: *See—*
Quilliou, Guy, 5,035,120, Cl. 62-341.000.

Pike-Biegunski, Maciej J.; Krebaum, Paul; and Arneson, Don A., to Molex Incorporated. Electroluminescent lamp panel and method of fabricating same. 5,036,249, Cl. 313-509.000.

Pillsbury Company, The: *See—*
Huang, Victor T.; Hoseney, R. Carl; Graf, Ernst; Ghiasi, Katy; Miller, Linda C.; Weber, Jean L.; Gaertner, Karin C.; Matson, Kristin L.; Hunstiger, Antoinette M.; Rogers, Deborah K.; and Saguy, Israel A., 5,035,904, Cl. 426-243.000.

Pin Dot Products: *See—*
Axelson, Peter; Heinrich, Michael; Lasko-Harvill, Ann; and Silverman, Michael W., 5,035,467, Cl. 297-440.000.

Pioneer Electronic Corporation: *See—*
Ando, Hitoshi, 5,036,329, Cl. 342-357.000.
Hayashi, Ryutaro; Yoshino, Toshikazu; and Kimura, Yukio, 5,036,510, Cl. 369-283.000.
Keitoku, Noboru, 5,036,188, Cl. 250-216.000.
Kobayashi, Kazuo; Yamada, Yoshinori; Morikawa, Kiyoshi; Kurumada, Masakazu; and Sugihara, Masanori, 5,036,509, Cl. 369-75.200.
Murata, Yasushi; and Matsui, Fumio, 5,036,208, Cl. 250-487.100.
Okano, Takashi, 5,036,508, Cl. 369-50.000.
Tomita, Toshihiko, 5,036,503, Cl. 369-36.000.
Ueno, Eiji, 5,036,543, Cl. 381-94.000.
Watanabe, Tomomi; and Komata, Hiroyuki, 5,036,247, Cl. 313-496.000.
Yamashita, Masakazu, 5,036,507, Cl. 369-44.320.
Yoshida, Susumu; Onishi, Sei; and Uchiyama, Kenji, 5,036,407, Cl. 360-25.000.

Piorunneck, Heinz; Noschese, Rocco J.; and Ramirez, Fernando J., to Burndy Corporation. Ground shielded bi-level card edge connector. 5,035,631, Cl. 439-108.000.

Piper Industries of Texas, Inc.: *See—*
Stahl, Edward L., 5,035,326, Cl. 206-507.000.

Pirelli SAPSA S.p.A.: *See—*
Carotti, Luciano, 5,035,846, Cl. 264-48.000.

Pitman-Moore, Inc.: *See—*
Mia, Abdus S., 5,036,047, Cl. 514-15.000.

Plank, Johann: *See—*
Aignesberger, Alois; Weichmann, Josef; Plank, Johann; and Bichler, Manfred, 5,035,812, Cl. 252-8.510.

Plantronics, Inc.: *See—*
Hanon, David O.; and Walker, Ricky R., 5,036,536, Cl. 379-387.000.

Platt, Royce: *See—*
Halpert, Pinke; and Platt, Royce, 5,035,725, Cl. 51-293.000.

Plattner, Jacob J.: *See—*
Stein, Herman H.; and Plattner, Jacob J., 5,036,051, Cl. 514-18.000.

Plichta, Edward J.; and Behl, Wishvander; K., to United States of America, Army. High temperature rechargeable molten salt battery. 5,035,963, Cl. 429-103.000.

Plone, Clifford. Dispenser system with elongated selectively activatable dispensing pusher. 5,035,320, Cl. 206-219.000.

Plotkin, Jeffrey S.: *See—*
Dougherty, James A.; Plotkin, Jeffrey S.; Vara, Fulvio J.; and Narayanan, Kolazi S., 5,036,112, Cl. 522-31.000.

Plundo, Robert A.: *See—*
Nebesh, Eugene; Plundo, Robert A.; and McMahon, Steven L., 5,035,793, Cl. 208-143.000.

Pockets of Learning: *See—*
Bloom, Stuart J., 5,035,013, Cl. 5-420.000.

Pohl, Harald, to Bekum Maschinenfabriken GmbH. Coextrusion head. 5,035,596, Cl. 425-133.100.

Pohrt, Juergen: *See—*
Walter, Hans-Michael; Bronstert, Klaus; Gausepohl, Hermann; and Pohrt, Juergen, 5,036,130, Cl. 524-505.000.

Pokress, Robert L.: *See—*
Gechter, Jerry; Fried, Jeffrey A.; and Pokress, Robert L., 5,036,535, Cl. 379-210.000.

Polatomic, Inc.: *See—*
Slocum, Robert E., 5,036,278, Cl. 324-304.000.

Poole, Donald R., to Automotive Systems Laboratory, Inc. Azide-free gas generant composition with easily filterable combustion products. 5,035,757, Cl. 149-46.000.

Popp, Joachim, to MTU Motoren-und Turbinen-Union Munchen GmbH. Arrangement for adjusting guide blades. 5,035,572, Cl. 415-12.000.

Poss, Kathleen M., to FMC Corporation. Herbicidal compounds. 5,035,740, Cl. 71-93.000.

Post, Steven W.: *See—*
Brickell, Joseph W.; and Post, Steven W., 5,035,357, Cl. 239-156.000.

Potvin, Robert E.; St. Albaa, Jonas O.; and Sobodacha, Chester J., to Hoechst Celanese Corporation. Photosensitive article having phenolic photosensitizers containing quinone diazide and acid halide substituents. 5,035,976, Cl. 430-165.000.

Poulin, Willie F. Brake mechanism for carts and dollies. 5,035,445, Cl. 280-763.100.

Powerpak Lures, Inc.: *See—*
Pearce, Frank G., 5,035,075, Cl. 43-26.200.

Powers, Richard: *See—*
Anderson, James E.; Dennis, Wendell; and Powers, Richard, 5,035,671, Cl. 452-37.000.

PPG Industries, Inc.: *See—*
Chakrabarti, Paritosh M.; Johnson, Harlan B.; Korach, Malcolm; Leatherman, Dennis D.; Reinhardt, Linda P.; and Simmons, Robert R., 5,035,886, Cl. 424-78.000.
Lin, Chia-Cheng; Basil, John D.; and Hunia, Robert M., 5,035,745, Cl. 106-287.160.
Schimmel, Karl F.; and Blackburn, William P., 5,035,925, Cl. 427-386.000.

Prabhu, Ashok N.: *See—*
Conlon, Edward J.; Prabhu, Ashok N.; Boardman, Simon M.; and Pendrick, Valerie A., 5,035,939, Cl. 428-137.000.

Prais, Wes: *See—*
Alchas, Paul G.; Augello, Frank A.; Brooks, Christopher J.; Cutshall, Tony A.; DiPisa, Joseph A., Jr.; Williams, Stuart K.; Gabel, Jonathan B.; Mulhauser, Paul J.; Prais, Wes; Jarrell, Bruce E.; and Rose, Deborah G., 5,035,708, Cl. 623-1.000.

Prasil, Vladimir: *See—*
Beran, Jaroslav; Pavlu, Milos; Prasil, Vladimir; Holy, Zdenek; Pesek, Frantisek; Vitamvas, Zdenek; and Vitak, Josef, 5,035,369, Cl. 242-18.0DD.

Pratt, William J.: *See—*
Barrow, Jeffrey; Pratt, William J.; and Tsuei, Henry T., 5,036,322, Cl. 341-144.000.

Precision Fabrics Group: *See—*
Kinlaw, William S.; and Baldwin, Alfred F., 5,035,943, Cl. 428-290.000.

Prednis, Leonard J.; Proctor, Michael L.; and Sugarman, Alan D., to TRW Inc. Modular automated avionics test system. 5,036,479, Cl. 364-580.000.

President and Fellows of Harvard College: *See—*
Antoniades, Harry N.; and Lynch, Samuel E., 5,035,887, Cl. 424-85.200.

Preston, David M.: *See—*
Walton, Erlen B.; Preston, David M.; Oliver, James L.; and Juriga, James A., 5,035,408, Cl. 267-265.000.

Preston, Howard J. Automatic focusing system for use with a motion picture camera. 5,035,501, Cl. 352-140.000.

Prince, Martin: *See—*
Pytryga, Frank G.; and Prince, Martin, 5,035,269, Cl. 141-1.000.

Prise, Michael E.: *See—*
Cloonan, Thomas J.; Jewell, Jack L.; McCormick, Frederick B., Jr.; Miller, David A. B.; and Prise, Michael E., 5,036,512, Cl. 370-2.000.

Probst, Anton: *See—*
Frohlich, Alfons; and Probst, Anton, 5,035,125, Cl. 66-193.000.

Proctor, Michael L.: *See—*
Prednis, Leonard J.; Proctor, Michael L.; and Sugarman, Alan D., 5,036,479, Cl. 364-580.000.

Prodanovic, Anton: *See—*
Gulati, Kailash C.; and Prodanovic, Anton, 5,035,541, Cl. 405-217.000.

Pronin, Lev A.: *See—*
Arabei, Boris G.; Kostyrev, Sergei B.; Mints, Alexandr S.; Pronin, Lev A.; Ryzhonkov, Dmitry I.; Sopochkin, Sergei A.; Stepnov, Sergei A.; Esikman, Vladimir L.; Vasiliev, Andrei V.; and Kolgin, ALexandr P., 5,036,170, Cl. 219-10.410.

Prosen, Gildo G. Cargo tie-down device. 5,035,558, Cl. 410-96.000.

Prosyma Research Limited: *See—*
Bush, Stephen F., 5,035,848, Cl. 264-174.000.

Prowse, Daniel: *See—*
Smestad, Thomas L.; Prowse, Daniel; Chu, George H.; and Hendricks, Diana M., 5,035,715, Cl. 623-16.000.

Prugar, Mark L.: *See—*
Jackson, Melvin R.; Prugar, Mark L.; Yang, Swe-Wong; Rairden, John R., III; and Gigliotti, Michael F. X., Jr., 5,035,958, Cl. 428-553.000.

Ptasinski, Stanley. Energy conserving engine. 5,035,115, Cl. 60-712.000.

Pugh, Joel A.: *See—*
Carter, Howard E.; Pugh, Joel A.; and Pierce, Byron C., 5,036,533, Cl. 379-59.000.

Pukari, Vimal K.; Paille, Norman I., Jr.; Thibaudeau, Thomas P.; and Khaund, Arup K., to Norton Company. Sol-gel alumina shaped bodies. 5,035,724, Cl. 51-309.000.

Pullman, Gerald S.: *See—*
Gupta, Pramod K.; and Pullman, Gerald S., 5,036,007, Cl. 435-240.450.

Pullukat, Thomas J.: *See—*
Meverden, Craig C.; and Pullukat, Thomas J., 5,036,147, Cl. 526-119.000.

Purcell, Nick L.; Schmidt, Joseph A.; and O'Malley, John A., to United States of America, Navy. Shearing type ordnance venting device. 5,035,180, Cl. 102-481.000.

Purcell, Nick L.; Schmidt, Joseph A.; and O'Malley, John A., to United States of America, Navy. Bending type ordnance venting device. 5,035,182, Cl. 102-481.000.

Puritch, George S.; Bradbury, Roderick; and Mason, Wenda, to Safer, Inc. Fatty acid based emulsifiable concentrate having herbicidal activity. 5,035,741, Cl. 71-113.000.

Purtell, George J.: *See—*
Crittenden, James F.; and Purtell, George J., 5,035,686, Cl. 604-96.000.

Purvis, Edward J.: *See—*
Marshall, Albert H.; Wolff, Ronald S.; McCormack, Robert T.; and Purvis, Edward J., 5,035,622, Cl. 434-23.000.

Putnam, Peter H.; and Durcan, Michael P., to Ex-Cell-O GmbH. Machine tool. 5,035,088, Cl. 51-165.710.

Pyorre, Ismo: *See—*
Lahtinen, Matti; and Pyorre, Ismo, 5,036,268, Cl. 322-28.000.

Pytryga, Frank G.; and Prince, Martin, to Emergency Containment Systems. Safety gas cylinder containment system. 5,035,269, Cl. 141-1.000.

Quackenbush, Allen B.; and Rigsby, James G., to Olin Corporation. Ultrapure hydrazine production. 5,035,775, Cl. 203-12.000.

Quadlux, Inc.: *See—*
Westerberg, Eugene R.; and Beaver, Robert I., II, 5,036,179, Cl. 219-411.000.

Quam, Dean R.: *See—*
Schmitz, Robert J.; and Quam, Dean R., 5,035,336, Cl. 212-166.000.

Quantum Chemical Corporation: *See—*
Meverden, Craig C.; and Pullukat, Thomas J., 5,036,147, Cl. 526-119.000.

Quilliou, Guy, to Pierre Guerin S.A. Freezer. 5,035,120, Cl. 62-341.000.

Quintanilla, Alberto: *See—*
Quintanilla, Roberto; and Quintanilla, Alberto, 5,036,446, Cl. 362-399.000.

Quintanilla, Roberto; and Quintanilla, Alberto. Lamp handle cover system for surgical lamps. 5,036,446, Cl. 362-399.000.

Qvarnstrom, Bengt G. L., to Stora Kopparbergs Bergslags Aktiebolag. Method and a device designed to arrange and pack seedlings. 5,035,105, Cl. 53-448.000.

R. J. Reynolds Tobacco Company: *See—*
Hasegawa, Morihiro; and Yamauchi, Takashi, 5,035,278, Cl. 164-428.000.

Raasch, Hans, to W. Schlafhorst AG & Co. Assembly for palletizing cross-wound bobbins. 5,035,571, Cl. 414-789.500.

Rabilloud, Guy: *See—*
Senneron, Michel; Parrain, Gilbert; Rabilloud, Guy; and Sillion, Bernard, 5,036,111, Cl. 521-182.000.

Rabinovich, William S.: *See—*
Bowman, Steven R.; and Rabinovich, William S., 5,036,520, Cl. 372-41.000.

Rabren, Michael S., to North American Cylinders. Recovery of solvent from acetylene steel cylinders to make the cylinders disposable. 5,035,774, Cl. 202-164.000.

Racal Safety Limited: *See—*
Edwards, David B., 5,035,239, Cl. 128-205.230.

Radisson, Joel: *See—*
Bouisset, Michel; and Radisson, Joel, 5,036,156, Cl. 562-496.000.

Radnedge, Colin G., to Rolls-Royce plc. Electrochemical drilling apparatus. 5,035,788, Cl. 204-224.00M.

Rainville, Gilles A., to Rockwell International Corporation. Space saver service clamp. 5,035,383, Cl. 248-68.100.

Rairden, John R., III: *See—*
Jackson, Melvin R.; Prugar, Mark L.; Yang, Swe-Wong; Rairden, John R., III; and Gigliotti, Michael F. X., Jr., 5,035,958, Cl. 428-553.000.

Ramakrishnan, Muni S.: *See—*
Kalinowski, Paul W.; Ramakrishnan, Muni S.; Rue, Charles V.; Sheldon, David A.; and Swanson, Brian E., 5,035,723, Cl. 51-309.000.

Rametsteiner, Hermann; Schwaha, Karl; Hirschmanner, Franz; and Bramerdorfer, Heinz, to Voest-Alpine Industrieanlagenbau Gesellschaft m.b.H. Arrangement for continuously casting a continuous metal sheet. 5,035,279, Cl. 164-428.000.

Ramirez, Fernando J.: *See—*
Piorunneck, Heinz; Noschese, Rocco J.; and Ramirez, Fernando J., 5,035,631, Cl. 439-108.000.

Rand, Paul K.: *See—*
Newell, Robert E.; Rand, Paul K.; and Fitzsimmons, Robert A., 5,035,237, Cl. 128-203.150.

Ranganathan, Ramachandran: *See—*
Sovak, Milos; and Ranganathan, Ramachandran, 5,035,877, Cl. 424-5.000.

Ransom, Stephen A.: *See—*
Hohmann, Jere W.; Rogers, Bruce J.; Ransom, Stephen A.; and Clementi, Daniel M., 5,036,216, Cl. 309-269.000.

Rantanen-Lee, Ann M., to C.R. Bard, Inc. Protective tubing clamp apparatus. 5,035,399, Cl. 251-10.000.

Rapindex Incorporated: *See—*
Fisch, Alfred C., 5,035,134, Cl. 72-405.000.

RASI Corporation: *See—*
Nirenberg, Morris; and Tucci, Jerry, 5,035,192, Cl. 112-110.000.

Raszewski, Lewis R.: *See—*
Kipnees, Jerome J.; and Raszewski, Lewis R., 5,035,078, Cl. 47-24.000.

Rathman, John R.; and Peters, Donald L., to Phillips Petroleum Company. Blow molding and compression molding of an article. 5,035,604, Cl. 425-525.000.

Ratti, Giuseppina: *See—*
Colle, Roberto; Camaggi, Giovanni; Gozzo, Franco; Ratti, Giuseppina; Mirenna, Luigi; and Garavaglia, Carlo, 5,036,094, Cl. 514-383.000.

Rattigan, Paul M.; and Lemons, Thomas M., to Rattigan, Paul M. Task light. 5,036,436, Cl. 362-33.000.

Rau, Bantwal R.; and Towle, Ross A., to Hewlett-Packard Company. Horizontal computer having register multiconnect for execution of a loop with overlapped code. 5,036,454, Cl. 364-200.000.

Raynet Corporation: *See—*
Geller, William L., 5,036,189, Cl. 250-205.000.
Raytheon Company: *See—*
Kelleher, John J., Jr.; and Shute, Donald W., 5,036,450, Cl. 363-26.000.
RCA Licensing Corporation: *See—*
Aschwanden, Felix, 5,036,293, Cl. 331-1.000.
Reavell, James; and Heath, Raymond, to School Bus Parts Co. of Canada, Inc. Weather resistant control system for school bus safety device. 5,036,307, Cl. 340-487.000.
Recker, Bradley J.: *See—*
Rozman, Christopher J.; Recker, Bradley J.; and Roe, Derrick I., 5,036,451, Cl. 363-41.000.
Redman, Theodore M.: *See—*
Busch, Robert E.; Hovis, William P.; Redman, Theodore M.; Thoma, Endre P.; and Yankosky, James A., 5,036,495, Cl. 365-233.000.
Redrow, Allan. String straightener for tennis racket. 5,035,429, Cl. 273-73.00R.
Reeves, Stuart J.: *See—*
Collier, John C.; and Reeves, Stuart J., 5,035,649, Cl. 439-607.000.
Rege, Satish: *See—*
Leis, Michael D.; Leshay, Bruce; Muchnik, Michael; Rege, Satish; Riggle, Charles M.; and Weng, Lih-Jyh, 5,036,408, Cl. 360-48.000.
Reich, Robert R.; and Olesen, Jan, to Triple R. Designs, Inc. Machine for cutting wings of skate fish. 5,035,674, Cl. 452-169.000.
Reichert, Marion: *See—*
Schmidt, Jurgen; Furche, Thomas; Erdmann, Roland; Reichert, Marion; Bayer, Ullrich; Kurze, Peter; Schwarz, Thomas; Schreckenbach, Joachim; Kletke, Hans-Jurgen; Hoffmann, Andreas; Heppner, Martin; Hasse, Anja; Schmidt, Dorith; and Klaus, Annette, 5,035,781, Cl. 204-129.900.
Reimers, Ulrich, to BTS Broadcast Television Systems GmbH. Video production facility. 5,036,395, Cl. 358-185.000.
Reinert, Robert C.: *See—*
Thomas, David A.; O'Connell, Robert M.; Reinert, Robert C.; and Gillin, John M., 5,035,935, Cl. 428-43.000.
Reinhardt, Linda P.: *See—*
Chakrabarti, Paritosh M.; Johnson, Harlan B.; Korach, Malcolm; Leatherman, Dennis D.; Reinhardt, Linda P.; and Simmons, Robert R., 5,035,886, Cl. 424-78.000.
Rekow, Peter O.: *See—*
Braun, David L.; Rekow, Peter O.; and Meyer, Daniel E., 5,035,240, Cl. 128-205.270.
Renders, Martinus A.; and Sastra, Budiman, to U.S. Philips Corporation. System for random access to information on a magnetic tape. 5,036,410, Cl. 360-72.200.
Renner, Karl; and Shanklin, John P., to Texas Instruments Incorporated. Master/slave sequencing processor. 5,036,453, Cl. 364-200.000.
Repine, Joseph T.: *See—*
Himmelsbach, Richard; Hodges, John C.; Kaltenbronn, James S.; Patt, William C.; Repine, Joseph T.; and Sircar, Ila, 5,036,053, Cl. 514-19.000.
Kaltenbronn, James S.; and Repine, Joseph T., 5,036,054, Cl. 514-19.000.
Research Association for Utilization of Light Oil: *See—*
Baba, Shigeo; Shibata, Yukio; Kawamura, Takahiro; Takaoka, Hideo; Kimura, Tsuguo; Kousaka, Kazuo; Minato, Yoshihiro; Yokoyama, Naruo; Iida, Kozo; and Imai, Tetsuya, 5,036,035, Cl. 502-221.000.
Research Corporation of the University of Hawaii, The: *See—*
Holm-Kennedy, James W.; and Umemoto, Donald K., 5,036,286, Cl. 324-661.000.
Research Development Corporation of Japan: *See—*
Nishizawa, Junichi, 5,035,767, Cl. 156-613.000.
Research Foundation of State University of New York, The: *See—*
Henderson, Ronald W.; and Blankenbaker, Paul, 5,036,334, Cl. 342-460.000.
Reuter, Wolfgang, to Leybold Aktiengesellschaft. Apparatus for annealing and quenching. 5,035,405, Cl. 266-250.000.
Rexham Corporation: *See—*
Winton, Robert A.; and Christie, Eugene F., 5,035,940, Cl. 428-174.000.
Reynolds, Mickey R.: *See—*
Chapin, John T.; Jackson, Charles W.; Mensah, Thomas O.; and Reynolds, Mickey R., 5,035,169, Cl. 89-1.340.
Rezanka, Ivan, to Xerox Corporation. Thermal ink jet printhead with droplet volume control. 5,036,337, Cl. 346-1.100.
Rhodes, Robert B.; and Eckert, Rudolf J. A., to Shell Oil Company. Oil compositions containing modified star polymers. 5,035,820, Cl. 252-50.000.
Rhone-Poulenc Chimie: *See—*
Chane-Ching, Jean-Yves; and Le Loarer, Jean-Luc, 5,035,834, Cl. 252-313.100.
Perrin, Patrice, 5,036,125, Cl. 524-405.000.
Rhone-Poulenc Rhodia Aktiengesellschaft: *See—*
Dollhopf, Rudiger, 5,035,355, Cl. 228-104.000.
Rhone-Poulenc Sante: *See—*
Comte, Marie-Therese; Gueremy, Claude; Malleron, Jean-Luc; Mignani, Serge; Peyronel, Jean-Francois; and Truchon, Alain, 5,036,075, Cl. 514-293.000.
Riboud, Paul-Victor: *See—*
Huin, Didier; and Riboud, Paul-Victor, 5,035,280, Cl. 164-463.000.
Rich, Rayna E. Collapsible riding companion. 5,035,072, Cl. 40-539.000.
Richards, Donald S.: *See—*
Batey, Johnathan H.; and Richards, Donald S., 5,036,195, Cl. 250-288.000.
Richards, John W.: *See—*
Samad, Raphael; Richards, John W.; and Walters, Carl W., 5,036,393, Cl. 358-140.000.
Richards, Randall R.: *See—*
Hudson, Gregory L.; Issa, Khaled M.; Richards, Randall R.; and Sprick, William L., 5,035,212, Cl. 123-323.000.
Ricketts, Jon E.: *See—*
Dunn, Neil C.; McMillen, Richard E.; and Ricketts, Jon E., 5,035,675, Cl. 460-62.000.
Ricoh Company, Ltd.: *See—*
Ema, Hidetoshi; and Takahashi, Hiroshi, 5,036,519, Cl. 372-38.000.
Inokuchi, Toshiyuki, 5,035,486, Cl. 350-167.000.
Niito, Yoshiharu, 5,035,198, Cl. 118-653.000.
Riddell, Inc.: *See—*
Wingo, James C., Jr.; and Kraemer, Nelson, 5,035,009, Cl. 2-414.000.
Ridgway, David R. Anti-rotation lock apparatus for inside deadbolt locks. 5,035,128, Cl. 70-211.000.
Rieger, Bernhard: *See—*
Dorsch, Dieter; Eidenschink, Rudolf; Rieger, Bernhard; and Marowsky, Gerd, 5,035,839, Cl. 252-587.000.
Riehl, Fred, to Robertshaw Controls Company. Jet burner construction, heating apparatus utilizing the jet burner construction and methods of making the same. 5,035,609, Cl. 431-286.000.
Riggle, Charles M.: *See—*
Leis, Michael D.; Leshay, Bruce; Muchnik, Michael; Rege, Satish; Riggle, Charles M.; and Weng, Lih-Jyh, 5,036,408, Cl. 360-48.000.
Rigsby, James G.: *See—*
Quackenbush, Allen B.; and Rigsby, James G., 5,035,775, Cl. 203-12.000.
Riley, Brian, to Combustion Engineering, Inc. Internal cross-anchoring and reinforcing of multi-layer conductive oxides. 5,035,961, Cl. 429-30.000.
Rinehart, Dixie. Liquid heat transfer glove. 5,035,003, Cl. 2-159.000.
Rinehart, Michael K.; and Ziegelmeyer, James J., to General Electric Company. Flame retardant blends of polycarbonate, ABS and a terpolymer. 5,036,126, Cl. 524-141.000.
Rink, Roland: *See—*
Lettau, Hans; and Rink, Roland, 5,035,853, Cl. 376-441.000.
Riso Kagaku Corporation: *See—*
Takita, Nagon; and Noguchi, Yoshihiro, 5,035,175, Cl. 101-116.000.
Rittal-Werk Rudolf Loh GmbH & Co. KG: *See—*
Schafer, Helmut, 5,035,647, Cl. 439-557.000.
Ritter, Wolfgang: *See—*
Uredat, Claus; and Ritter, Wolfgang, 5,035,186, Cl. 108-159.000.
Rittmayer, Gerhard: *See—*
Kammermaier, Johann; and Rittmayer, Gerhard, 5,035,917, Cl. 427-41.000.
Ritvik Group Inc., The: *See—*
Bertrand, Victor J., 5,035,324, Cl. 206-457.000.
Rives, Allen K. Blade or member to drill or enlarge a bore in the earth and method of forming. 5,035,293, Cl. 175-57.000.
Roane, James B. Endodontic post with spiral groove. 5,035,620, Cl. 433-221.000.
Robbins, Ronald B.; Sakowski, John D.; and Walden, William R., to Sakowski and Robbins Corporation. Method of applying dye. 5,035,018, Cl. 8-150.000.
Robert Bosch GmbH: *See—*
Burkard, Johannes; Hettich, Gerhard; and Schmid, Hans-Dieter, 5,035,137, Cl. 73-146.500.
Friedrich, Hornung; and Hans-Joachim, Vogt, 5,036,234, Cl. 307-632.000.
Robertshaw Controls Company: *See—*
Riehl, Fred, 5,035,609, Cl. 431-286.000.
Robeson, Lloyd M.: *See—*
Kawakami, James H.; Harris, James E.; Maresca, Louis M.; and Robeson, Lloyd M., 5,036,150, Cl. 528-173.000.
Robine, Magali: *See—*
Jarrin, Jacques; Robine, Magali; and Durand, Jean-Pierre, 5,035,822, Cl. 252-51.50R.
Robinson, Richard A.: *See—*
Buckley, Stephen P.; Robinson, Richard A.; Hurlburt, John H.; Pfahl, Kurt A.; and Doerflinger, Arthur E., 5,036,472, Cl. 364-479.000.
Robinson, William P.: *See—*
Parker, Norman W.; Robinson, William P.; and Piccioni, Robert L., 5,035,787, Cl. 204-192.340.
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Rocha, Joaquim; and Daniel, Jose, to Danro Tool Company Inc. Meat preparation machine. 5,035,672, Cl. 452-141.000.
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Miller, Dale W.; and Crofutt, Thomas A., 5,035,176, Cl. 101-148.000.
Rainville, Gilles A., 5,035,383, Cl. 248-68.100.
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Chen, Catherine S. H.; and Rodewald, Paul G., 5,035,818, Cl. 252-47.500.
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Rozman, Christopher J.; Recker, Bradley J.; and Roe, Derrick I., 5,036,451, Cl. 363-41.000.
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Blette, Russell E.; and Roeser, John O., 5,035,350, Cl. 222-212.000.
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Neubecker, Karlheinz; Rohde, Cordt; and Welzig, Gerhard, 5,035,611, Cl. 432-176.000.
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Frazza, Mark S.; and Smith, Linda S., 5,035,944, Cl. 428-312.400.
Ilenda, Casmir S.; Frantz, Thomas M.; and Freed, William T., 5,035,933, Cl. 428-36.600.
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White, Robert T.; Liebig, Thomas J.; and Switzer, Jeffrey K., 5,035,133, Cl. 72-350.000.
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Daines, John W.; Benn, Bryan L.; and Stoll, Walter H., 5,035,411, Cl. 269-231.000.
Radnedge, Colin G., 5,035,788, Cl. 204-224.00M.
Romeuf, Patrick: *See*—
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Ross, Sherwood B. Exercise bicycle. 5,035,417, Cl. 272-73.000.
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Rothermel, Albrecht, to Telefunken Electronic GmbH. Integrated semiconductor circuit having a unidirectional semiconductor component for preventing saturation of bipolar transistors. 5,036,233, Cl. 307-570.000.
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Garrison, Robert L.; and Rothwell, Harold L., 5,036,256, Cl. 315-308.000.
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Rozenblatt, Mike M.; and Volpe, Andrew L., to MAG Aerospace Industries, Inc. Self draining sanitation system. 5,035,011, Cl. 4-665.000.
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Markunas, Albert L.; and Rozman, Gregory I., 5,036,267, Cl. 322-10.000.
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Chip, Gerald K.; and Rudin, Alfred, 5,036,109, Cl. 521-57.000.
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Chang, Richard R.; and Rudnic, Edward M., 5,035,898, Cl. 424-474.000.
Rudoy, Edward; and Lin, Michael A., to ITT Corporation. Card connector with interceptor plate. 5,035,632, Cl. 439-108.000.
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Ruf, Hermann. Orthopaedic exercise frame. 5,035,233, Cl. 128-25.00B.
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Runkel, Richard A.; and Lee, Jung-Chung, to Syntex (U.S.A.) Inc. Controlled release subcutaneous implant. 5,035,891, Cl. 424-423.000.
Russ, Michael B.: *See*—
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Rutledge, John M., to Chevron Research and Technology Company. Method for cement evaluation using acoustical logs. 5,036,496, Cl. 367-35.000.
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Rydell, Mark A., to Everest Medical Corporation. Electrosurgical instrument for conducting endoscopic retrograde sphincterotomy. 5,035,696, Cl. 606-47.000.
Rymut, Michael J.: *See*—
Munch, Carl A.; Cooper, Stephen R. W.; and Rymut, Michael J., 5,036,275, Cl. 324-207.170.
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Takahashi, Shoji; and Miyamoto, Kouichi, 5,035,059, Cl. 30-392.000.
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Sorrells, Anthony M., 5,035,684, Cl. 493-342.000.
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Arabei, Boris G.; Kostyrev, Sergei B.; Mints, Alexandr S.; Pronin, Lev A.; Ryzhonkov, Dmitry I.; Sopochkin, Sergei A.; Stepnov, Sergei A.; Esikman, Vladimir L.; Vasiliev, Andrei V.; and Kolgin, ALexandr P., 5,036,170, Cl. 219-10.410.
Rzeszotarski, Waclaw J.; Guzewska, Maria E.; McPherson, Daniel W.; Spagnuolo, Ciro J.; and Natalie, Kenneth J., Jr., to Marion Merrell Dow Inc. 1,7-substituted heptyn-2-ones and use. 5,036,107, Cl. 514-648.000.
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Valette, Michel, 5,035,520, Cl. 384-526.000.
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Uronen, Lasse J.; and Saarela, Matti J., 5,036,432, Cl. 361-422.000.
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Steidl, Gary V.; Sabin, Cullen M.; and Thomas, Dennis A., 5,035,230, Cl. 126-263.000.
Sachs, Isaac. Top shield arrangement for filter traps. 5,036,161, Cl. 174-40.00R.
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Sadeh, Yaacov; and Makover, Ysacov. Electro optically corrected coordinate measuring machine. 5,035,503, Cl. 356-152.000.
Sadler, Jeffery G.; Tuggle, Lloyd H.; and Collins, Imack L., to White Consolidated Industries, Inc. Portable hand-held blower/vacuum unit with resilient engine mounting system. 5,035,586, Cl. 417-363.000.
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Saeki, Naomi: *See*—
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Saeki, Shuji; Suehiro, Masatoshi; Echigo, Masashi; Okada, Susumu; and Sakuraba, Masami, to Dia-Ichi Kogyo Seiyaku Co., Ltd.; and Dowa Mining Co., Ltd. Copper paste composition. 5,035,837, Cl. 252-512.000.

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Puritch, George S.; Bradbury, Roderick; and Mason, Wenda, 5,035,741, Cl. 71-113.000.
Sedun, Frederick S., 5,035,956, Cl. 428-537.100.

Sager, Tamara L.: *See*—
Kaufman, Stephen B.; DiGianfilippo, Aleandro; Sager, Tamara L.; and Meyer, Alan R., 5,036,462, Cl. 364-413.010.

Saguy, Israel A.: *See*—
Huang, Victor T.; Hoseney, R. Carl; Graf, Ernst; Ghiasi, Katy; Miller, Linda C.; Weber, Jean L.; Gaertner, Karin C.; Matson, Kristin L.; Hunstiger, Antoinette M.; Rogers, Deborah K.; and Saguy, Israel A., 5,035,904, Cl. 426-243.000.

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Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Nakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, 5,036,350, Cl. 354-475.000.

Saiki, Toru: *See*—
Shimizu, Norihiko; Sato, Kanji; Saiki, Toru; Goto, Kunio; Matsubara, Masuo; and Wada, Hiroshi, 5,035,410, Cl. 269-136.000.

Saini, Avtar, to Intel Corporation. Method and circuitry for digital system multiplication. 5,036,482, Cl. 364-760.000.

Sainola, John P.: *See*—
Ackerman, William H., Jr.; and Sainola, John P., 5,036,465, Cl. 364-423.000.

St. Alban, Jonas O.: *See*—
Potvin, Robert E.; St. Alban, Jonas O.; and Sobodacha, Chester J., 5,035,976, Cl. 430-165.000.

Saito, Hideo: *See*—
Fujita, Shigeru; Saito, Hideo; Yamamoto, Katsuyuki; Endo, Satoshi; and Kamahora, Fumio, 5,035,598, Cl. 425-144.000.
Kozaki, Shyuichi; Okada, Masako; Funada, Fumiaki; Sasaki, Kei; Saito, Hideo; and Takeshita, Fusayuki, 5,035,928, Cl. 428-1.000.

Saito, Hitoshi H. S.: *See*—
Kanto, Jumpei J. K.; Saito, Hitoshi H. S.; Eguchi, Hiroshi H. E.; and Nakamura, Masayuki M. N., 5,036,041, Cl. 503-227.000.

Saito, Sadahiro: *See*—
Uemura, Tadashi; Minagawa, Tsutomu; and Saito, Sadahiro, 5,035,742, Cl. 75-623.000.

Saito, Shinji; and Ogawa, Hiroshi, to Fuji Photo Film Co., Ltd. Magnetic recording medium and a method for preparing the medium. 5,035,948; Cl. 428-329.000.

Saito, Tomotaka: *See*—
Sakai, Hideo; Oikawa, Kiyoharu; and Saito, Tomotaka, 5,036,223, Cl. 307-448.000.

Sakabe, Yukio: *See*—
Omori, Nagato; Sano, Harunobu; Kohno, Yoshiaki; and Sakabe, Yukio, 5,036,425, Cl. 361-321.000.

Sakaguchi, Katsuyoshi: *See*—
Soeda, Koji; Kubota, Yoshiya; Okamoto, Shoji; Kubota, Akinori; Kobayashi, Michihito; Ijiri, Masaaki; Ozawa, Susumu; Tomosada, Kiyoshi; Irie, Nobuhiko; Hasegawa, Akira; Katayama, Hideaki; Murakami, Toshifumi; and Sakaguchi, Katsuyoshi, 5,035,591, Cl. 425-40.000.

Sakai, Akihiro: *See*—
Iwasaki, Takeshi; Yatomi, Takeshi; and Sakai, Akihiro, 5,036,174, Cl. 219-69.120.

Sakai, Hideo; Oikawa, Kiyoharu; and Saito, Tomotaka, to Kabushiki Kaisha Toshiba. Inverter circuit and chopper type comparator circuit using the same. 5,036,223, Cl. 307-448.000.

Sakai, Ikuo: *See*—
Nakamura, Yasuhiro; Sakai, Ikuo; and Kawabuchi, Masami, 5,035,245, Cl. 128-661.090.

Sakai, Nobuo; and Ohno, Shigeru, to Fuji Photo Film Co., Ltd. Silver halide color photographic material. 5,035,986, Cl. 430-522.000.

Sakamoto, Jun-ichi; Onkura, Tetsuya; and Yoshida, Kouichi, to Matsushita Electric Works, Ltd. Reciprocating shower device for human usage when showering. 5,035,010, Cl. 4-567.000.

Sakamoto, Kiichi: *See*—
Kataoka, Toyotaka; and Sakamoto, Kiichi, 5,036,209, Cl. 250-492.200.

Sakamoto, Kiichiro, to Fuji Photo Film Co., Ltd. Magazine for photosensitive material. 5,036,353, Cl. 355-72.000.

Sakamoto, Masanori; and Kubota, Masaharu, to Fuji Jukogyo Kabushiki Kaisha. Idling speed adjusting system for an automotive engine. 5,035,216, Cl. 123-339.000.

Sakane, Katsunobu, to Toyoda Gosei Co., Ltd. Steering wheel horn switch. 5,036,169, Cl. 200-61.540.

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Yamakawa, Akira; Sakanoue, Hitoyuki; and Takeuchi, Hisao, 5,036,026, Cl. 501-96.000.

Sakanoue, Kei: *See*—
Nakamura, Yoshisada; Morigaki, Masakazu; Ishii, Yoshio; and Sakanoue, Kei, 5,035,988, Cl. 430-551.000.

Sakata, Masakazu; Shibata, Kenichi; Takeuchi, Kousuke; Tanaka, Toshiharu; Okano, Hiroshi; Tsujino, Toshikazu; and Kuroki, Kazuhiko, to Sanyo Electric Co., Ltd. Liquid crystal chopper and infrared sensor. 5,036,199, Cl. 250-351.000.

Sakaue, Yoshikazu; Sumi, Kazuhiko; and Nakajima, Keiji, to Mitsubishi Kenki Kabushiki Kaisha. Apparatus for discriminating linearity of line segment in image processing system. 5,036,544, Cl. 382-24.000.

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Orikasa, Yuichi; and Sakazume, Suehiro, 5,036,120, Cl. 523-436.000.

Sakiyama, Tetsuo; Tsuyama, Seishi; and Minakawa, Kuninori, to NKK Corporation. Heat treating method for high strength aluminum alloy. 5,035,754, Cl. 148-159.000.

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Robbins, Ronald B.; Sakowski, John D.; and Walden, William R., 5,035,018, Cl. 8-150.000.

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Robbins, Ronald B.; Sakowski, John D.; and Walden, William R., 5,035,018, Cl. 8-150.000.

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Sakurai, Kiyokazu, to Mitsubishi Pencil Co., Ltd. Instruments for applying a liquid coating including a writing instrument, a cosmetic applicator or similar devices. 5,035,524, Cl. 401-206.000.

Salco Products Inc.: *See*—
Schultz, Francis R., 5,035,185, Cl. 105-424.000.

Salembier, Philippe; and Hayet, Pascal, to U.S. Philips Corporation. Apparatus including an improved device for recovering the d.c. component. 5,036,388, Cl. 358-34.000.

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Beeuwkes, Reinier, III; Stella, Joseph B.; and Salisbury, Thomas E., 5,035,420, Cl. 272-95.000.

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Wood, Willis A.; and Wondrack, Lillian M., 5,036,013, Cl. 435-281.000.

Salomon, Mary F., to Lubrizol Corporation, The. N-substituted thio alkyl phenothiazines. 5,035,817, Cl. 252-47.500.

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Cho, Sung-Hee; Do, Jae-Young; and Kim, Jin-Ki, 5,036,272, Cl. 324-158.00R.
Jo, Sooin; and Yu, Jaiwhan, 5,036,227, Cl. 307-480.000.
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Sanchez, Richard E. Utility cut patch identification tag. 5,035,531, Cl. 404-12.000.

Sandbank, Barry M., to Smith & Nephew plc. Adhesive dressings. 5,035,687, Cl. 604-180.000.

Sanders, Glenn. Method and apparatus for obtaining identical output signal from nominally identical time base corrector unit having slightly different characteristics. 5,036,406, Cl. 360-25.000.

Sanders, Joseph. Adapter for attaching an animal call to a firearm. 5,035,390, Cl. 248-231.000.

Sandhu, Gurtej S.; Schultz, Laurence D.; and Doan, Trung T., to Micron Technology, Inc. Method of endpoint detection during chemical/mechanical planarization of semiconductor wafers. 5,036,015, Cl. 437-8.000.

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Burns, Johnny L.; and Wilson, Richard, 5,035,738, Cl. 71-88.000.

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Sangyoji, Kazuo; Mano, Morimasa; and Miyabayashi, Takeshi, to Brother Kogyo Kabushiki Kaisha. Printed circuit board having a thin film cell incorporated therein. 5,035,965, Cl. 429-124.000.

Sano, Harunobu: *See*—
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Sanofi: *See*—
Bouisset, Michel; and Radisson, Joel, 5,036,156, Cl. 562-496.000.
Van Broeck, Didier; and Mosse, Madeleine, 5,036,077, Cl. 514-317.000.

Sanwa Kagaku Kenyusho Co., Ltd.: *See*—
Kurono, Masayasu; Usui, Toshinao; Miura, Kenji; Kondo, Yasuaki; and Sawai, Kiichi, 5,036,080, Cl. 514-333.000.

Sanyo Electric Co., Ltd.: *See*—
Haruki, Toshinobu, 5,036,400, Cl. 358-228.000.
Sakata, Masakazu; Shibata, Kenichi; Takeuchi, Kousuke; Tanaka, Toshiharu; Okano, Hiroshi; Tsujino, Toshikazu; and Kuroki, Kazuhiko, 5,036,199, Cl. 250-351.000.
Tamura, Yutaka; Hosokawa, Yoshio; Noro, Satoshi; and Kondo, Kazuhiko, 5,036,471, Cl. 364-449.000.
Watanabe, Hiroshi; Hioki, Toshiaki; and Morita, Yosihiko, 5,036,404, Cl. 358-337.000.

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Wilson, Geoffrey; and Evans, Gareth A., 5,036,173, Cl. 219-69.110.

Sarin S.S. Ausiliari e Ricerca Informatica: *See*—
Barillari, Piero; DeSanti, Pierluigi; Galderesi, Mario; Marchi, Carlo A.; Natili, Franco; Rossiello, Vincenzo; Settembre, Donato; and Urbinati, Francesco, 5,036,314, Cl. 340-717.000.

Sarin, Vinod K., to GTE Laboratories Incorporated. Process for the deposition of high temperature stress and oxidation resistant coatings on silicon-based substrates. 5,035,923, Cl. 427-255.000.

Sartorio, Franco; and Vergano, Stefano, to Amada Company, Limited. Automatic change of fingers of the single arm bending robot. 5,035,566, Cl. 414-729.000.

Saruta, Akira: *See*—
Aizawa, Kooji; Nii, Katsutoshi; Kawaike, Kazuhiko; Hasegawa, Kengo; Saruta, Akira; and Nakashima, Ryoichi, 5,035,519, Cl. 384-121.000.

Saruwatari, Nobuya: *See—*
Yoshimura, Toru; Uchida, Akio; Ito, Takaaki; and Saruwatari, Nobuya, 5,036,420, Cl. 361-118.000.
Sasaki, Gordon H.; Jakubczak, Eugene R.; and Gauger, John R. D., to Dow Corning Wright Corporation. Method of making envelope for tissue expander. 5,035,249, Cl. 128-899.000.
Sasaki, Hiroaki: *See—*
Ouchi, Junichi; Nakase, Koji; and Sasaki, Hiroaki, 5,036,182, Cl. 235-462.000.
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Sasaki, Hitoshi, to NHK Spring Co., Ltd. Card reader using linear card conveyer means. 5,036,184, Cl. 235-479.000.
Sasaki, Kei: *See—*
Kozaki, Shyuichi; Okada, Masako; Funada, Fumiaki; Sasaki, Kei; Saito, Hideo; and Takeshita, Fusayuki, 5,035,928, Cl. 428-1.000.
Sasaki, Shoko: *See—*
Shiokawa, Kozo; Tsuboi, Shinichi; Sasaki, Shoko; Moriya, Koichi; Hattori, Yumi; and Shibuya, Katsuhiko, 5,036,082, Cl. 514-338.000.
Sasaki, Takashi; Kasumi, Takafumi; Kubo, Naoya; Kainuma, Keiji; Wako, Katsuo; Ishizuka, Hiroaki; Kawaguchi, Gaku; and Oda, Tsunero, to Director of National Food Research Institute, Ministry of Agriculture, Forestry and Fisheries; and Nikken Chemicals Co., Ltd. Novel Aureobasidium sp. microorganisms and method for obtaining the same, and method for preparing erythritol with the same. 5,036,011, Cl. 435-255.000.
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Renders, Martinus A.; and Sastra, Budiman, 5,036,410, Cl. 360-72.200.
SAT (Societe Anonyme de Telecommunications): *See—*
Ouhayoun, Michel M., 5,035,506, Cl. 356-349.000.
Satake, Akemi: *See—*
Suzuki, Kunio; Abe, Masayoshi; Kinka, Mikio; Arai, Yasuyuki; Satake, Akemi; Nishi, Kazuo; Kugawa, Shuichi; and Ishida, Noriya, 5,035,753, Cl. 136-249.000.
Sato, Kanji: *See—*
Shimizu, Norihiko; Sato, Kanji; Saiki, Toru; Goto, Kunio; Matsubara, Masuo; and Wada, Hiroshi, 5,035,410, Cl. 269-136.000.
Sato, Makoto: *See—*
Ozeki, Kohji; Tsukamoto, Yoshitsugu; Yaginuma, Hideya; and Sato, Makoto, 5,036,052, Cl. 514-19.000.
Sato, Takayuki: *See—*
Asayama, Yoshio; Tsubota, Makio; Okura, Yasunori; and Sato, Takayuki, 5,035,312, Cl. 192-85.00R.
Sato, Yuzuru: *See—*
Iijima, Chiyoaki; Sato, Yuzuru; Wada, Hiroshi; Okumura, Osamu; and Kamada, Satoshi, 5,035,489, Cl. 350-335.000.
Satoh, Hitoshi: *See—*
Tanaka, Katsumasa; Satoh, Hitoshi; Kawakami, Heijiro; and Marukawa, Nobuaki, 5,035,752, Cl. 134-32.000.
Sau, Arjun C., to Aqualon Company. Silated polyvinyl alcohol process. 5,036,137, Cl. 525-61.000.
Saunders, Jonathan E.: *See—*
Dick, G. John; and Saunders, Jonathan E., 5,036,299, Cl. 331-25.000.
Sawa, Kenji: *See—*
Baba, Fumiaki; Izumi, Masanori; Sawa, Kenji; and Kurumida, Susumu, 5,035,308, Cl. 192-0.052.
Sawada, Kenji: *See—*
Kamimura, Kuniaki; Sawada, Kenji; and Yamade, Yasushi, 5,036,352, Cl. 355-45.000.
Sawai, Kiichi: *See—*
Kurono, Masayasu; Usui, Toshinao; Miura, Kenji; Kondo, Yasuaki; and Sawai, Kiichi, 5,036,080, Cl. 514-333.000.
Sayeed, Fakrul A. A.: *See—*
Alam, Abu S.; Sayeed, Fakrul A. A.; Koziol, Kenneth J.; and Kapoor, John N., 5,036,060, Cl. 514-110.000.
Saylor, Robert F.; and Spector, George. Liquid line chlorine cleaner. 5,035,796, Cl. 210-198.100.
Scarborough, Joseph H. Lawn mower with trimming attachment. 5,035,107, Cl. 56-10.400.
Schade, Irene M.: *See—*
Grondin, David H.; and Schade, Irene M., 5,035,811, Cl. 210-806.000.
Schafer, Helmut, to Rittal-Werk Rudolf Loh GmbH & Co. KG. Device for securing a receptacle housing in an opening of a wall. 5,035,647, Cl. 439-557.000.
Scharnowski, Gerhard: *See—*
Gottling, Helmut; Moller, Rudolf; Muller, Peter; and Scharnowski, Gerhard, 5,035,171, Cl. 92-137.000.
Scheibert, Kristen A.: *See—*
Lutz, Michael A.; and Scheibert, Kristen A., 5,036,114, Cl. 522-20.000.
Scheller, Dennis M. Therapeutic device. 5,035,421, Cl. 272-96.000.
Schellhorn, Franz: *See—*
Waitl, Guenter; and Schellhorn, Franz, 5,035,483, Cl. 350-96.200.
Schemmel, Hans-Robert, to U.S. Philips Corporation. Circuit arrangement for clock recovery. 5,036,288, Cl. 328-15.000.
Schering Corporation: *See—*
Chang, Richard R.; and Rudnic, Edward M., 5,035,898, Cl. 424-474.000.
Gu, Ben; Bliznik, Kenneth E.; Singer, Helmut K.; and Ward, Sharon M., 5,035,859, Cl. 422-28.000.
Watkins, Robert W., 5,036,048, Cl. 514-16.000.
Schiller, Philip; and Brick, Michael. Collapsible disposable cat litter box. 5,035,205, Cl. 119-168.000.
Schimmel, Karl F.; and Blackburn, William P., to PPG Industries, Inc. Process for applying to a substrate a copolymer of an alpha-olefin and an olefinically unsaturated monoanhydride. 5,035,925, Cl. 427-386.000.
Schirmer, Henry G., to W. R. Grace & Co.-Conn. Method of making very high barrier film. 5,035,851, Cl. 264-514.000.
Schlak, Ottfried: *See—*
Burow, Wilfried; Kischkewitz, Jurgen; and Schlak, Ottfried, 5,035,748, Cl. 106-499.000.
Schlumberger Technology Corporation: *See—*
Trouiller, Jean-Claude; and Gounot, Marie-Therese, 5,036,283, Cl. 324-375.000.
Schlump, Dieter, to Alcatel N.V. Method of changing the spot diameter of single-mode step-index fibers, and single-mode fiber coupling unit made by said method. 5,035,477, Cl. 350-96.300.
Schmalbach, Therese K.: *See—*
Borch, Richard F.; and Schmalbach, Therese K., 5,035,878, Cl. 424-10.000.
Schmaling, David N.: *See—*
Byrnes, Francis E.; and Schmaling, David N., 5,035,576, Cl. 416-134.00R.
Schmer, Gottfried, to Akzo NV. Analysis membranes with improved compatibility. 5,035,801, Cl. 210-490.000.
Schmid, Hans-Dieter: *See—*
Burkard, Johannes; Hettich, Gerhard; and Schmid, Hans-Dieter, 5,035,137, Cl. 73-146.500.
Schmid, Herman, to Nobel Kemi AB. Method for producing explosive substances. 5,035,843, Cl. 264-3.200.
Schmid, Lawrence A., to Aero-Mod, Inc. Modular clarifier with integral flocculator. 5,035,795, Cl. 210-197.000.
Schmidt, Dorith: *See—*
Schmidt, Jurgen; Furche, Thomas; Erdmann, Roland; Reichert, Marion; Bayer, Ullrich; Kurze, Peter; Schwarz, Thomas; Schreckenbach, Joachim; Kletke, Hans-Jurgen; Hoffmann, Andreas; Heppner, Martin; Hasse, Anja; Schmidt, Dorith; and Klaus, Annette, 5,035,781, Cl. 204-129.900.
Schmidt, George R.: *See—*
Sellers, Roger G.; and Schmidt, George R., 5,035,406, Cl. 267-48.000.
Schmidt, Joseph A.: *See—*
Purcell, Nick L.; Schmidt, Joseph A.; and O'Malley, John A., 5,035,180, Cl. 102-481.000.
Purcell, Nick L.; Schmidt, Joseph A.; and O'Malley, John A., 5,035,182, Cl. 102-481.000.
Schmidt, Jurgen; Furche, Thomas; Erdmann, Roland; Reichert, Marion; Bayer, Ullrich; Kurze, Peter; Schwarz, Thomas; Schreckenbach, Joachim; Kletke, Hans-Jurgen; Hoffmann, Andreas; Heppner, Martin; Hasse, Anja; Schmidt, Dorith; and Klaus, Annette, to Jenoptik Jena GmbH. Electrolyte for the production of black surface layers on light metals. 5,035,781, Cl. 204-129.900.
Schmidtberg, Werner: *See—*
Jonas, Friedrich; Heywang, Gerhard; Schmidtberg, Werner; Heinze, Jurgen; and Dietrich, Michael, 5,035,926, Cl. 427-393.100.
Schmitt, Paul F.: *See—*
Filion, Joseph L.; Sundquist, Douglas F.; Schmitt, Paul F.; Evanitsky, Eugene S.; and Warddrip, Riley L., 5,036,361, Cl. 355-209.000.
Schmitz, Robert J.; and Quam, Dean R. Compact collapsible manhole cover lifter. 5,035,336, Cl. 212-166.000.
Schneid, Edward J.: *See—*
Gottesman, Stephen R.; and Schneid, Edward J., 5,036,546, Cl. 382-65.000.
Schneider, Fernand: *See—*
Fischer, Ulf; Schneider, Fernand; and Widmer, Ulrich, 5,036,066, Cl. 514-211.000.
Schneider, Hans: *See—*
Hollenberg, Detlef; Schneider, Hans; and Weihrauch, Georg, 5,035,251, Cl. 132-112.000.
Schneider, Sharron L. Leisure wear stocking. 5,035,008, Cl. 2-239.000.
Schneider, Werner: *See—*
Leiber, Heinz; Schneider, Werner; Waxenberger, Erich; Klarer, Martin; Zimmer, Richard; and Burckhardt, Manfred, 5,035,295, Cl. 180-140.000.
Schnoes, Heinrich K.: *See—*
DeLuca, Hector F.; Schnoes, Heinrich K.; Sicinski, Rafal R.; and Tanaka, Yoko, 5,036,061, Cl. 514-167.000.
Schofberger, Johann: *See—*
Leuchtenmuller, Rudolf; Kapeller, Manfred; and Schofberger, Johann, 5,035,033, Cl. 28-115.000.
Schoffs, Alain R.: *See—*
Jarreau, Francois X.; Rovei, Vincenzo; Koenig, Jean-Jacques; and Schoffs, Alain R., 5,036,090, Cl. 514-376.000.
Jarreau, Francois X.; Rovei, Vincenzo; Koenig, Jean-Jacques; and Schoffs, Alain R., 5,036,091, Cl. 514-376.000.
Schommer, Alan J.: *See—*
Denzin, Dirk E.; Lull, Robert E.; and Schommer, Alan J., 5,035,327, Cl. 206-518.000.
Schommer, Duane J.: *See—*
Paxon, James F.; and Schommer, Duane J., 5,036,360, Cl. 355-208.000.

Schonbach, Dave I., to Du Pont de Nemours, E. I., and Company. Method of determining control instructions. 5,036,262, Cl. 318-38.000.
School Bus Parts Co. of Canada, Inc.: *See*—
Reavell, James; and Heath, Raymond, 5,036,307, Cl. 340-487.000.
Schorner, Gerd: *See*—
Forster, Alfred; and Schorner, Gerd, 5,036,477, Cl. 364-567.000.
Schouten, Arend J.: *See*—
Wegner, Gerhard; Schouten, Arend J.; Duda, Gisela; and Arndt, Thomas, 5,035,762, Cl. 156-230.000.
Wegner, Gerhard; Duda, Gisela; Bubeck, Christoph; and Schouten, Arend J., 5,035,763, Cl. 156-230.000.
Schrader, Gary E.; and Nelson, H. Thomas, to Burndy Corporation. Multiple tap ground connector. 5,036,164, Cl. 174-94.00R.
Schreckenbach, Joachim: *See*—
Schmidt, Jurgen; Furche, Thomas; Erdmann, Roland; Reichert, Marion; Bayer, Ullrich; Kurze, Peter; Schwarz, Thomas; Schreckenbach, Joachim; Kletke, Hans-Jurgen; Hoffmann, Andreas; Heppner, Martin; Hasse, Anja; Schmidt, Dorith; and Klaus, Annette, 5,035,781, Cl. 204-129.900.
Schroeder, Thomas J. Luer-loc-tipped vial—syringe combination. 5,035,689, Cl. 604-234.000.
Schulcz, Francis: *See*—
Dubail, Alain; Pailhes, Alain; and Schulcz, Francis, 5,036,200, Cl. 250-356.200.
Schulte, Robert L., to Grumman Aerospace Corporation. Bi-directional neutron detector. 5,036,202, Cl. 250-370.050.
Schultz, Francis R., to Salco Products Inc. Outlet gate pan gasket for hopper cars. 5,035,185, Cl. 105-424.000.
Schultz, Laurence D.: *See*—
Sandhu, Gurtej S.; Schultz, Laurence D.; and Doan, Trung T., 5,036,015, Cl. 437-8.000.
Schultz, William R., Jr.: *See*—
Elton, Richard K.; and Schultz, William R., Jr., 5,036,165, Cl. 174-102.0SC.
Schulz, Dieter: *See*—
Hoefelmayr, Tilman; and Schulz, Dieter, 5,035,139, Cl. 73-223.000.
Schumann, Hans-Joachim: *See*—
Odenwalder, Heinrich; Kruger, Thomas; and Schumann, Hans-Joachim, 5,035,987, Cl. 430-544.000.
Schuster, Gary B.: *See*—
Gottschalk, Peter; Neckers, Douglas C.; Schuster, Gary B.; Adair, Paul C.; and Pappas, S. Peter, 5,035,621, Cl. 433-226.000.
Schwaha, Karl: *See*—
Rametsteiner, Hermann; Schwaha, Karl; Hirschmanner, Franz; and Bramerdorfer, Heinz, 5,035,279, Cl. 164-428.000.
Schwalm, Reinhold: *See*—
Nguyen-Kim, Son; Hoffmann, Gerhard; and Schwalm, Reinhold, 5,035,979, Cl. 430-270.000.
Schwartz, Carey, to United States of America, Navy. Multiple quantum well device. 5,036,371, Cl. 357-16.000.
Schwarz, Thomas: *See*—
Schmidt, Jurgen; Furche, Thomas; Erdmann, Roland; Reichert, Marion; Bayer, Ullrich; Kurze, Peter; Schwarz, Thomas; Schreckenbach, Joachim; Kletke, Hans-Jurgen; Hoffmann, Andreas; Heppner, Martin; Hasse, Anja; Schmidt, Dorith; and Klaus, Annette, 5,035,781, Cl. 204-129.900.
Schweikert, Walter. Device for mixing liquids. 5,035,262, Cl. 137-607.000.
Schweitzer, Doris: *See*—
Gork, Fritz-Peter; Muller, Klaus-Dieter; and Schweitzer, Doris, 5,036,001, Cl. 435-31.000.
SciMed Life Systems, Inc.: *See*—
Burns, Matthew M., 5,035,705, Cl. 606-194.000.
Scott, Clyde M. Electrical indoor broiler. 5,036,180, Cl. 219-443.000.
Scott, Douglas F., to United States of America, Interior. Method of mapping underground mines. 5,035,060, Cl. 33-228.000.
Scott, Owen S., to Commonwealth of Australia, The. Infrared signature control mechanism. 5,036,211, Cl. 250-495.100.
Seabrook, Colin; and Makin, David, to J. H. Fenner & Co. Limited. Swivel or rotating joint. 5,035,448, Cl. 285-94.000.
Seagate Technology, Inc.: *See*—
Krum, Richard G.; and Bucknam, Neil E., 5,035,396, Cl. 248-635.000.
Toensing, Eyvand E., 5,035,044, Cl. 29-603.000.
Seal, John S., Jr., to John S. Seal, Jr., Revocable Trust, The. Juice extractor. 5,035,174, Cl. 100-52.000.
Sechler, Robert F.: *See*—
Masleid, Robert P.; and Sechler, Robert F., 5,036,215, Cl. 307-243.000.
Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britian and Northern Ireland, The: *See*—
Sadeghi, Majid M.; and Stephens, Vivian M., 5,035,307, Cl. 188-372.000.
Sedun, Frederick S., to Safer, Inc. Lumber product protected by an anti-fungal composition. 5,035,956, Cl. 428-537.100.
Seeburger, Helmut. Method of monitoring the path of an annular blade through a semiconductor material. 5,036,274, Cl. 324-207.160.
Seefried, Karl-Heinz: *See*—
Jahn, Hans-Georg; Beisel, Hermann; and Seefried, Karl-Heinz, 5,035,178, Cl. 101-425.000.
Segner, Bryan P.: *See*—
Dautremont-Smith, William C.; Katz, Avishay; Koszi, Louis A.; Segner, Bryan P.; and Thomas, Peter M., 5,036,023, Cl. 437-184.000.
Sehr, Willibald: *See*—
Harms, Paul; and Sehr, Willibald, 5,035,290, Cl. 172-1.000.
Seibert, Gerhard: *See*—
Lattrell, Rudolf; Durckheimer, Walter; and Seibert, Gerhard, 5,036,063, Cl. 514-192.000.
Seifert, Robert P., to Institute Guilfoyle. Container having a pressure-rupturable seal for dispensing contents. 5,035,348, Cl. 222-107.000.
Seigenji, Kiyoshi: *See*—
Hoda, Takeo; Taniguchi, Nobuyuki; and Seigenji, Kiyoshi, 5,036,342, Cl. 354-21.000.
Seiko Epson Corporation: *See*—
Aizawa, Hitomi, 5,036,276, Cl. 324-207.210.
Aruga, Tomoe; and Yokouchi, Hideya, 5,036,417, Cl. 360-106.000.
Iijima, Chiyoaki; Sato, Yuzuru; Wada, Hiroshi; Okumura, Osamu; and Kamada, Satoshi, 5,035,489, Cl. 350-335.000.
Seiko Instruments Inc.: *See*—
Imai, Saburo, 5,036,338, Cl. 346-76.0PH.
Shimbo, Masafumi, 5,036,374, Cl. 357-23.200.
Suzuki, Teruo; Ogawa, Kenichi; and Murakami, Hiroshi, 5,035,780, Cl. 204-129.350.
Sekida, Minoru: *See*—
Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Nakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, 5,036,350, Cl. 354-475.000.
Sekiguchi, Takeshi: *See*—
Nishiguchi, Masanori; Sekiguchi, Takeshi; Miyoshi, Ikkei; and Nishio, Kiyoshi, 5,035,087, Cl. 51-131.100.
Sekikawa, Ayako: *See*—
Sugi, Hideo; Sekikawa, Ayako; and Takahashi, Ryoichi, 5,036,087, Cl. 514-372.000.
Sekine, Mikiya; and Hiraishi, Shigetoshi, to Mitsubishi Paper Mills Limited. Heat-sensitive recording material. 5,036,039, Cl. 503-217.000.
Sellers, Roger G.; and Schmidt, George R., to Moog Automotive, Inc. Variable rate secondary spring for a primary leaf suspension spring. 5,035,406, Cl. 267-48.000.
Semiconductor Energy Laboratory Co., Ltd.: *See*—
Kobayashi, Ippei, 5,035,488, Cl. 350-333.000.
Suzuki, Kunio; Abe, Masayoshi; Kinka, Mikio; Arai, Yasuyuki; Satake, Akemi; Nishi, Kazuo; Kugawa, Shuichi; and Ishida, Noriya, 5,035,753, Cl. 136-249.000.
Yamazaki, Shunpei, 5,036,373, Cl. 357-17.000.
Senneron, Michel; Parrain, Gilbert; Rabilloud, Guy; and Sillion, Bernard, to Centre D'Etude des Materiaux Organiques pour Technologies Avancees. Expanded materials with nadimide resin base. 5,036,111, Cl. 521-182.000.
Senoo, Seiiti, to Sharp Kabushiki Kaisha. Key input apparatus with light-shielding plates and liquid crystal shutter. 5,036,191, Cl. 250-229.000.
Serio, John A.: *See*—
Mathews, Will W.; Serio, John A.; and Grinsteiner, James J., 5,035,637, Cl. 439-271.000.
Servial CC ApS: *See*—
Larsen, Allan R., 5,035,127, Cl. 70-56.000.
Serwatzky, Gunter, to Dipl.-Ing. Wrede & Niedecken Verwaltung GmbH. Procedure and device for corrosion determination. 5,036,287, Cl. 324-700.000.
Setaka, Yousuke: *See*—
Takeuchi, Kanji; Setaka, Yousuke; and Arita, Satoshi, 5,035,218, Cl. 123-361.000.
Settembre, Donato: *See*—
Barillari, Piero; DeSanti, Pierluigi; Galderesi, Mario; Marchi, Carlo A.; Natili, Franco; Rossiello, Vincenzo; Settembre, Donato; and Urbinati, Francesco, 5,036,314, Cl. 340-717.000.
Settlemier, Brock R.; Bone, Steven R.; Tolivaisa, John; and Nugent, James E., to Bigge Crane and Rigging Co. Support cradle for load equalization. 5,035,395, Cl. 248-634.000.
SGS-Thompson Microelectronics S.A.: *See*—
Nicolai, Jean, 5,036,300, Cl. 331-143.000.
SGS-Thomson Microelectronics S.p.A.: *See*—
Mazzali, Stefano, 5,036,018, Cl. 437-43.000.
SGS-Thomson Microelectronics Srl: *See*—
Murari, Bruno; Morelli, Marco; and Maggioni, Giampietro, 5,036,269, Cl. 323-266.000.
Shaffer, John W., to GTE Products Corporation. Light-diffusing coating for a glass electric lamp bulb. 5,036,244, Cl. 313-116.000.
Shamlou, Daryush: *See*—
Halim, Raouf; and Shamlou, Daryush, 5,036,527, Cl. 375-98.000.
Shankland, Ian R.: *See*—
Magid, Hillel; Shankland, Ian R.; Wilson, David P.; Cook, Kane D.; and Lund, Earl A. E., 5,035,831, Cl. 252-171.000.
Shanklin, John P.: *See*—
Renner, Karl; and Shanklin, John P., 5,036,453, Cl. 364-200.000.
Shanley, Edward S.: *See*—
Spencer, Richard H.; Shanley, Edward S.; and Massucco, Arthur A., 5,035,145, Cl. 73-744.000.
Sharp, James W.: *See*—
Held, Jeffery S.; and Sharp, James W., 5,035,858, Cl. 422-21.000.
Sharp Kabushiki Kaisha: *See*—
Hashimoto, Minoru; and Migita, Haruyoshi, 5,035,366, Cl. 241-36.000.
Miyago, Makoto; Oka, Hiroshi; Imaya, Akihiko; Kato, Hiroaki; Nagayasu, Takayoshi; and Hirobe, Toshihiko, 5,036,370, Cl. 357-4.000.
Senoo, Seiiti, 5,036,191, Cl. 250-229.000.

Shiraishi, Kenichi; Uejima, Takamasa; and Katayama, Hironobu, 5,036,412, Cl. 360-85.000.
Sharp Kabushiki Kaisha & Chisso Corp.: *See*—
Kozaki, Shyuichi; Okada, Masako; Funada, Fumiaki; Sasaki, Kei; Saito, Hideo; and Takeshita, Fusayuki, 5,035,928, Cl. 428-1.000.
Shaw, Clifford O., to United States of America, Navy. Resonant probe and radio frequency coupler. 5,036,285, Cl. 324-546.000.
Sheaffer, Benjamin L.: *See*—
Corbett, William D.; and Sheaffer, Benjamin L., 5,035,276, Cl. 164-34.000.
Sheffield, William. Banana slicer. 5,035,056, Cl. 30-305.000.
Sheinberg, Haskell: *See*—
Dunn, Paul S.; Sheinberg, Haskell; Hogan, Billy M.; Lewis, Homer D.; and Dickinson, James M., 5,035,854, Cl. 420-3.000.
Sheldon, David A.: *See*—
Kalinowski, Paul W.; Ramakrishnan, Muni S.; Rue, Charles V.; Sheldon, David A.; and Swanson, Brian E., 5,035,723, Cl. 51-309.000.
Shell Oil Company: *See*—
Berggren, Mark A., 5,036,119, Cl. 523-351.000.
Clark, David M.; and Dogterom, Ronald J., 5,035,870, Cl. 423-277.000.
Hwo, Charles C., 5,036,140, Cl. 525-222.000.
Merrill, Connie L.; and Wood, Donald L., 5,035,838, Cl. 252-545.000.
Rhodes, Robert B.; and Eckert, Rudolf J. A., 5,035,820, Cl. 252-50.000.
Stamhuis, Jan E.; Broekhuis, Antonius A.; and Luijk, Pieter, 5,036,138, Cl. 525-99.000.
Titus, Paul E., 5,035,922, Cl. 427-239.000.
Shen, Anthony P.: *See*—
Dockrill, Mark B.; Buckham, John; and Shen, Anthony P., 5,035,936, Cl. 428-96.000.
Shen, Gary G., to Board of Regents, The University of Texas System. Method and apparatus for tuning and matching an NMR coil. 5,036,426, Cl. 361-329.000.
Shen, Jian-Chyun, to Union Oil Company of California. Process and composition for treating underground formations penetrated by a well borehole. 5,035,813, Cl. 252-8.551.
Sheng, Lin M. Apparatus for making bubbles in multiple layers. 5,035,665, Cl. 446-15.000.
Sheng, Zhengzhi: *See*—
Hermann, Allen M.; and Sheng, Zhengzhi, 5,036,044, Cl. 505-1.000.
Shepard, Donald F.; Fenolia, Robert J.; Nagle, Dennis C.; and Marousek, Michael E., to Martin Marietta Corporation. High-temperature, high-emissivity, optically black boron surface. 5,035,949, Cl. 428-337.000.
Shibanaka, Mitsugu; and Yamamoto, Haruo, to Mita Industrial Co., Ltd. Method of controlling driving of conveyor means in automatic document conveying device. 5,035,414, Cl. 271-227.000.
Shibano, Yasuji, to Hosiden Electronics Co., Ltd. Multipin connector socket. 5,035,652, Cl. 439-610.000.
Shibata, Kenichi: *See*—
Sakata, Masakazu; Shibata, Kenichi; Takeuchi, Kousuke; Tanaka, Toshiharu; Okano, Hiroshi; Tsujino, Toshikazu; and Kuroki, Kazuhiko, 5,036,199, Cl. 250-351.000.
Shibata, Masanori; Yamamoto, Masaru; Okimoto, Haruo; and Tashima, Seiji, to Mazda Motor Corporation. Air supply control systems for turbocharged internal combustion engines. 5,035,114, Cl. 60-612.000.
Shibata, Mitsuru; Hiramatsu, Yoshiyuki; Adachi, Ryoichi; and Mitsutake, Kenichiro, to Idemitsu Kosan Company Limited. Trifluoromethanesulfonamide derivative and a herbicide containing the same. 5,035,739, Cl. 71-91.000.
Shibata, Yukio: *See*—
Baba, Shigeo; Shibata, Yukio; Kawamura, Takahiro; Takaoka, Hideo; Kimura, Tsuguo; Kousaka, Kazuo; Minato, Yoshihiro; Yokoyama, Naruo; Iida, Kozo; and Imai, Tetsuya, 5,036,035, Cl. 502-221.000.
Shibayama, Katsutoshi: *See*—
Kawabata, Yasukazu; Hamaguchi, Susumu; Takahashi, Toshio; Yokota, Hiroshi; and Shibayama, Katsutoshi, 5,035,318, Cl. 198-779.000.
Shibayama, Takashi, to Nissan Motor Co., Ltd. Shift control system for automatic transmission. 5,035,159, Cl. 74-866.000.
Shibusawa, Koichi; and Ohsawa, Shigemitsu, to Eisai Co., Ltd. Emulsified and solubilized pharmaceutical preparation. 5,035,895, Cl. 424-450.000.
Shibuya, Katsuhiko: *See*—
Shiokawa, Kozo; Tsuboi, Shinichi; Sasaki, Shoko; Moriya, Koichi; Hattori, Yumi; and Shibuya, Katsuhiko, 5,036,082, Cl. 514-338.000.
Shibuya, Kunio: *See*—
Matsukura, Yoshihiro; Hisazumi, Nobuyuki; and Shibuya, Kunio, 5,035,955, Cl. 428-520.000.
Shibuya, Takemi: *See*—
Yamada, Tsutoo; Morizumi, Kenichi; Kamegai, Yuji; Kanno, Yasushi; and Shibuya, Takemi, 5,035,931, Cl. 428-35.700.
Shicoh Engineering Co., Ltd.: *See*—
Shiraki, Manabu; Miyao, Osami; Fujisawa, Shoji; and Kawashima, Shunji, 5,036,319, Cl. 341-115.000.
Shida, Yuu: *See*—
Igarashi, Toshio; Wakatsuki, Akira; Sudo, Kenichi; and Shida, Yuu, 5,036,124, Cl. 524-298.000.
Shields, Roger G., to Amoco Corporation. Seafloor drilling apparatus. 5,035,291, Cl. 175-5.000.
Shikoku Kakoki Co., Ltd.: *See*—
Wakabayashi, Shigeru; and Shimokawa, Masao, 5,035,101, Cl. 53-53.000.
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Nakayama, Hiroshi; Shimada, Hiroyuki; and Yumoto, Toshiyuki, 5,035,682, Cl. 475-66.000.
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Wakabayashi, Shigeru; and Shimokawa, Masao, 5,035,101, Cl. 53-53.000.
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Shin, Dong K., to Electronics and Telecommunications Research Institute; and Korea Telecommunication Authority. Digital auto-phase-controlled retiming circuit. 5,036,529, Cl. 375-119.000.
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Aoki, Hideki; Akao, Masaru; and Shin, Yoshiharu, 5,035,711, Cl. 623-11.000.
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Nakamura, Hiroaki, 5,036,368, Cl. 335-272.000.
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Taguchi, Hiroaki; Katsushima, Takeo; Ban, Masakazu; Takahashi, Mitsuru; Shinoda, Kiyotaka; and Watanabe, Akihiko, 5,036,086, Cl. 514-367.000.
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Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, 5,036,270, Cl. 324-96.000.
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Shiota, Kazuo, to Fuji Photo Film Co., Ltd. Photographic printer, video image and film image printing apparatus. 5,036,402, Cl. 358-244.000.
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Shiraishi, Kenichi; Uejima, Takamasa; and Katayama, Hironobu, to Sharp Kabushiki Kaisha. Magnetic recording and reproducing apparatus with single inclining post. 5,036,412, Cl. 360-85.000.
Shirakawa, Noriko: *See*—
Asahi, Masahiko; Shirakawa, Noriko; and Kikuta, Yuko, 5,036,108, Cl. 514-937.000.
Shiraki, Manabu; Miyao, Osami; Fujisawa, Shoji; and Kawashima, Shunji, to Shicoh Engineering Co., Ltd. Magnetic encoder using magnetoresistive element. 5,036,319, Cl. 341-115.000.
Shirasaka, Yuichi: *See*—
Kisaragi, Takayasu; and Shirasaka, Yuichi, 5,035,730, Cl. 55-269.000.
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Watanabe, Tadahiko; Doutsu, Tsuyoshi; Shobu, Kazuhisa; and Kai, Yukio, 5,036,028, Cl. 501-96.000.
Shoger, Kirk D.: *See*—
Hrib, Nicholas J.; Shoger, Kirk D.; and Tegeler, John J., 5,036,152, Cl. 544-57.000.
Shoji, Hisashi: *See*—
Haneda, Satoshi; Shoji, Hisashi; and Yoshino, Kunihisa, 5,036,367, Cl. 355-260.000.
Shoji, Michihiro, to Nitto Kohki Co., Ltd. Magnet base drill unit. 5,035,547, Cl. 408-6.000.
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Asano, Osamu; Shoji, Michihiro; and Kowada, Masunari, 5,035,549, Cl. 408-132.000.
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Katsuki, Masahide; and Shoji, Tsuneo, 5,035,086, Cl. 51-49.000.
Shopsmith, Inc.: *See*—
Berkeley, James E., 5,035,152, Cl. 74-194.000.
Showa Denko K.K.: *See*—
Uemura, Tadashi; Minagawa, Tsutomu; and Saito, Sadahiro, 5,035,742, Cl. 75-623.000.

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Uemura, Tadashi; Minagawa, Tsutomu; and Saito, Sadahiro, 5,035,742, Cl. 75-623.000.
Shute, Donald W.: *See—*
Kelleher, John J., Jr.; and Shute, Donald W., 5,036,450, Cl. 363-26.000.
Sicinski, Rafal R.: *See—*
DeLuca, Hector F.; Schnoes, Heinrich K.; Sicinski, Rafal R.; and Tanaka, Yoko, 5,036,061, Cl. 514-167.000.
SICPA Holding SA: *See—*
Amon, Albert; Boksanyi, Laszlo K.; and Degott, Pierre, 5,035,743, Cl. 106-21.000.
Siebertz, Peter, to Georg Sahm GmbH & Co. KG. Winding device for a yarn, in particular for a yarn with approximately zero elongation. 5,035,372, Cl. 242-45.000.
Siemens Aktiengesellschaft: *See—*
Bachhuber, Gerhard; and Buhse, Detlef, 5,036,318, Cl. 340-825.160.
Forster, Alfred; and Schorner, Gerd, 5,036,477, Cl. 364-567.000.
Kammermaier, Johann; and Rittmayer, Gerhard, 5,035,917, Cl. 427-41.000.
Karetsos, Anastasios; and Zwilling, Gerhard, 5,036,487, Cl. 365-51.000.
Lettau, Hans; and Rink, Roland, 5,035,853, Cl. 376-441.000.
von Gentzkow, Wolfgang; Huber, Jurgen; Rogler, Wolfgang; and Wilhelm, Dieter, 5,036,135, Cl. 524-786.000.
Waitl, Guenter; and Schellhorn, Franz, 5,035,483, Cl. 350-96.200.
Weihrich, Georg; Wohld, Dietrich; Niemann, Martin; and Jungkunz, Clemens, 5,036,265, Cl. 318-618.000.
Siemens Automotive L.P.: *See—*
Daly, Paul D.; and McArthur, Robert A., 5,035,214, Cl. 123-337.000.
Hornby, Michael J.; Spiers, Dean; and Cranford, Stephen, 5,035,224, Cl. 123-470.000.
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Siemon, John A.; and De Luca, Paul V, 5,035,645, Cl. 439-532.000.
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Main, Richard B., 5,035,116, Cl. 62-77.000.
Sillion, Bernard: *See—*
Senneron, Michel; Parrain, Gilbert; Rabilloud, Guy; and Sillion, Bernard, 5,036,111, Cl. 521-182.000.
Silva, Roy F., to International Flavors & Foods Ingredients Company, division of Indopco, Inc. High fiber bakery products. 5,035,903, Cl. 426-19.000.
Silverman, Michael W.: *See—*
Axelson, Peter; Heinrich, Michael; Lasko-Harvill, Ann; and Silverman, Michael W., 5,035,467, Cl. 297-440.000.
Simmons, Robert R.: *See—*
Chakrabarti, Paritosh M.; Johnson, Harlan B.; Korach, Malcolm; Leatherman, Dennis D.; Reinhardt, Linda P.; and Simmons, Robert R., 5,035,886, Cl. 424-78.000.
Simonette, Dallas W., to Diversified Dynamics Corporation. Bypass mode control for high pressure washing system. 5,035,580, Cl. 417-34.000.
Simonyi, Sandor; Torocsik, Laszlo ; Toth, Istvan; and Valoczi, Gyorgy, to Csepel Autogyar. Electropneumatic remote control for shifting the mechanical transmission of a motor vehicle. 5,035,113, Cl. 60-390.000.
Singer, Helmut K.: *See—*
Gu, Ben; Bliznik, Kenneth E.; Singer, Helmut K.; and Ward, Sharon M., 5,035,859, Cl. 422-28.000.
Singhal, Gopal H.: *See—*
Habeeb, Jacob J.; Singhal, Gopal H.; Billimoria, Rustom M.; and Stover, William H., 5,035,815, Cl. 252-32.70E.
Sink, Charles J.: *See—*
Lissaman, Peter B. S.; Morgan, W. R.; Cowley, Martyn B.; Sink, Charles J.; and Watson, William D., 5,035,382, Cl. 244-190.000.
Sircar, Ila: *See—*
Himmelsbach, Richard; Hodges, John C.; Kaltenbronn, James S.; Patt, William C.; Repine, Joseph T.; and Sircar, Ila, 5,036,053, Cl. 514-19.000.
Sirianno, James P. Method of indicating a location. 5,035,760, Cl. 156-67.000.
Six Corners Development Company: *See—*
Stein, Andrew M.; and DeSantis, John A., 5,035,173, Cl. 99-323.700.
Sjostrand, Goran, to AB Volvo. Vehicle engine suspension device. 5,035,296, Cl. 180-297.000.
Skalski, Clement A., to Otis Elevator Company. Elevator speed dictation system. 5,035,301, Cl. 187-118.000.
Skinner, Marjorie B.: *See—*
Snell, James B.; and Skinner, Marjorie B., 5,035,932, Cl. 428-36.400.
Skinner, Raymond C. D.: *See—*
Welch, Alan B.; Skinner, Raymond C. D.; and Goetz, Wendelin A., 5,035,206, Cl. 123-27.0GE.
SKW Trostberg Aktiengesellschaft: *See—*
Aignesberger, Alois; Weichmann, Josef; Plank, Johann; and Bichler, Manfred, 5,035,812, Cl. 252-8.510.
Sky, Phillip, to To Market, Two Markets, Inc. Process of making microwavable oatmeal composition. 5,035,913, Cl. 426-619.000.
Slabinski, Chester J.: *See—*
Leach, Robert B.; Slabinski, Chester J.; and Youla, Jean, 5,036,321, Cl. 341-33.000.
Slingerland, Charles R., Jr. Vehicular windshield wiper apparatus. 5,035,023, Cl. 15-250.190.
Slocum, Robert E., to Polatomic, Inc. Radiation source for helium magnetometers. 5,036,278, Cl. 324-304.000.
Sluyterman, Albertus A. S., to U.S. Philips Corporation. Picture display device with core means comprising compensation coils. 5,036,250, Cl. 315-8.000.
Smart, Charles F.; and D'Aquila, Anthony, to Emhart Inc. Automatic riveting machine. 5,035,353, Cl. 227-2.000.
Smestad, Thomas L.; Prowse, Daniel; Chu, George H.; and Hendricks, Diana M., to Collagen Corporation. Gamma irradiation of collagen/-mineral mixtures. 5,035,715, Cl. 623-16.000.
Smith, Donald W.: *See—*
Brock, James D.; and Smith, Donald W., 5,035,534, Cl. 404-81.000.
Smith, Felesta. Telescopic chute for a mixer truck. 5,035,313, Cl. 193-2.00B.
Smith, Lawrence E.: *See—*
Norman, Marvin N.; Smith, Lawrence E.; and Knight, Peter R., 5,036,257, Cl. 315-381.000.
Smith, Linda S.: *See—*
Frazza, Mark S.; and Smith, Linda S., 5,035,944, Cl. 428-312.400.
Smith & Loveless, Inc.: *See—*
Vaught, Reid W., 5,035,583, Cl. 417-200.000.
Smith, Magel. Clock assembly. 5,036,501, Cl. 368-88.000.
Smith & Nephew plc: *See—*
Sandbank, Barry M., 5,035,687, Cl. 604-180.000.
Smith, Oliver S.: *See—*
Parent, Edward D.; and Smith, Oliver S., 5,035,201, Cl. 118-726.000.
Smith, Paul: *See—*
Chanzy, Henri D.; Rotzinger, Bruno; and Smith, Paul, 5,036,148, Cl. 526-169.200.
Smith, Robert T.; and Chung, Chang-Hwa, to Microelectronics and Computer Technology Corporation. Electrical interconnect tape. 5,036,379, Cl. 357-69.000.
Smith, Wilson E.: *See—*
Downes, Robert W.; Smith, Wilson E.; Suciu, Ronald E.; and Wilson, Kenneth T., 5,036,514, Cl. 371-51.000.
Smiths Industries Medical systems, Inc.: *See—*
Bell, Craig J., 5,035,864, Cl. 422-99.000.
Smiths Industries Public Limited Company: *See—*
Kanegaonkar, Rahul G., 5,035,236, Cl. 128-201.130.
Smrt, Thomas J.; and Khan, Abdul F., to Fox Valley Systems, Inc. Two-step method for increasing the light-reflectivity of an object. 5,035,920, Cl. 427-202.000.
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Bohnenkamp, Heinrich, 5,035,036, Cl. 29-33.00C.
Snell, James B.; and Skinner, Marjorie B., to Phillips Petroleum Company. Gold colored polyolefin containers. 5,035,932, Cl. 428-36.400.
Snider, Phil. Rivet shaver rotational locking system. 5,035,529, Cl. 403-24.000.
Sobodacha, Chester J.: *See—*
Potvin, Robert E.; St. Alban, Jonas O.; and Sobodacha, Chester J., 5,035,976, Cl. 430-165.000.
Societe Anonyme Dite Hispano-Suiza: *See—*
Hersen, Rene M. J.; and Soutier, Pascal-Marie P. M., 5,035,379, Cl. 244-129.400.
Soeda, Koji; Kubota, Yoshiya; Okamoto, Shoji; Kubota, Akinori; Kobayashi, Michihito; Ijiri, Masaaki; Ozawa, Susumu; Tomosada, Kiyoshi; Irie, Nobuhiko; Hasegawa, Akira; Katayama, Hideaki; Murakami, Toshifumi; and Sakaguchi, Katsuyoshi, to Sumitomo Rubber Industries, Ltd.; and Mitsubishi Jukogyo Kabushiki Kaisha. Vulcanizing apparatus. 5,035,591, Cl. 425-40.000.
Soled, Stuart: *See—*
Iglesia, Enrique; Vroman, Hilda; Soled, Stuart; Baumgartner, Joseph; and Fiato, Rocco A., 5,036,032, Cl. 502-260.000.
Solid State Measurements, Inc.: *See—*
Mazur, Robert G.; Stephenson, Robert C.; and Zier, Donald A., Jr., 5,036,271, Cl. 324-158.00P.
Solomon, Allen L., to Grumman Aerospace Corporation. Superimposed detector arrays having optical filters. 5,036,203, Cl. 250-370.060.
Solter, Frederick H. Wood railing with metal foundation. 5,035,401, Cl. 256-19.000.
Somoza, Carlos, to Thiokol Corporation. Ultrasonic grinding of explosives. 5,035,363, Cl. 241-1.000.
Somura, Katsuzo. Process of producing liquor-included ice. 5,035,911, Cl. 426-515.000.
Song, Suk-Zu; Mehta, Surendra C.; Murthy, Kuchi S.; Nesbitt, Russell U.; and Fawzi, Mahdi B., to Warner-Lambert Company. Methylene pyrrolidone copolymers for contact lens and pharmaceutical preparations. 5,035,884, Cl. 424-78.000.
Sonobe, Tadasi; Katane, Mamoru; Ikeguchi, Takashi; Matsumoto, Manabu; Ueda, Shinjiro; Kobari, Toshiaki; Takahashi, Takao; Hayasaka, Toa; and Kitayama, Toyoki, to Hitachi, Ltd.; and Nippon Telegraph and Telephone Corp. Synchrotron radiation generation apparatus. 5,036,290, Cl. 328-235.000.
Sony Corporation: *See—*
Samad, Raphael; Richards, John W.; and Walters, Carl W., 5,036,393, Cl. 358-140.000.
Takao, Nobutaka; Yokoya, Satoshi; and Takagi, Kotaro, 5,036,301, Cl. 333-185.000.
Virtue, Peter J., 5,036,483, Cl. 364-786.000.
Sopochkin, Sergei A.: *See—*
Arabei, Boris G.; Kostyrev, Sergei B.; Mints, Alexandr S.; Pronin, Lev A.; Ryzhonkov, Dmitry I.; Sopochkin, Sergei A.; Stepnov,

Sergei A.; Esikman, Vladimir L.; Vasiliev, Andrei V.; and Kolgin, ALexandr P., 5,036,170, Cl. 219-10.410.

Sorg, Helmut: *See*—
Pieper, Helmut; Zschocher, Hartmut; and Sorg, Helmut, 5,035,735, Cl. 65-134.000.

Sorrells, Anthony M., to Ryobi Motor Products Corp. Pad sander paper punch assembly and method. 5,035,684, Cl. 493-342.000.

Soultanian, Daniel S.: *See*—
Steiner, Robert E.; and Soultanian, Daniel S., 5,035,024, Cl. 15-339.000.

Soutier, Pascal-Marie P. M.: *See*—
Hersen, Rene M. J.; and Soutier, Pascal-Marie P. M., 5,035,379, Cl. 244-129.400.

Sovak, Milos; and Ranganathan, Ramachandran, to Cook Imaging Corporation. Non-ionic contrast media from ionic contrast media. 5,035,877, Cl. 424-5.000.

Spaeth, Tilmann, to Bodenseewerk Perkin-Elmer GmbH (BSW). Multicomponent photometer. 5,036,198, Cl. 250-343.000.

Spagnuolo, Ciro J.: *See*—
Rzeszotarski, Waclaw J.; Guzewska, Maria E.; McPherson, Daniel W.; Spagnuolo, Ciro J.; and Natalie, Kenneth J., Jr., 5,036,107, Cl. 514-648.000.

Spallholtz, Howard. Snack tray assembly. 5,035,464, Cl. 297-144.000.

Spanovich, Joseph P. Variable alignment mechanism. 5,035,378, Cl. 244-49.000.

Spear, Stephen L., to Motorola Inc. Local PSTN interconnect with remote signal link processing. 5,036,531, Cl. 379-58.000.

Spector, Donald. Pneumatic play ball. 5,035,426, Cl. 273-65.0EG.

Spector, George: *See*—
Humble, Wayne; and Spector, George, 5,036,443, Cl. 362-183.000.
Saylor, Robert F.; and Spector, George, 5,035,796, Cl. 210-198.100.

Spectra Technologies Inc.: *See*—
Murray, Donald W., 5,035,441, Cl. 280-477.000.

Spectragraphics, Inc.: *See*—
Gurley, James, 5,036,315, Cl. 340-721.000.

Speer, Dietrich; Kiss, Akos; and Kleinschmit, Peter, to Degussa Aktiengesellschaft. Biege-brown encapsulated pigments and method of their production. 5,035,746, Cl. 106-438.000.

Speicher, John M.: *See*—
Voigt, Allan A.; York, Kenneth C.; and Speicher, John M., 5,035,376, Cl. 244-3.210.

Spencer, Richard H.; Shanley, Edward S.; and Massucco, Arthur A., to Arthur D. Little, Inc. Differential manometer pressure gage. 5,035,145, Cl. 73-744.000.

Spencer, William M.; and Breit, Joseph S., to Sundstrand Corporation. DC to AC inverter and method for producing three phases from two input phases. 5,036,448, Cl. 363-2.000.

Spielberger, Richard K.; and Dunaway, Thomas J., to Honeywell Inc. Universal semiconductor chip package. 5,036,163, Cl. 174-52.400.

Spiers, Dean: *See*—
Hornby, Michael J.; Spiers, Dean; and Cranford, Stephen, 5,035,224, Cl. 123-470.000.

Spindelfabrik Susen, Schurr, Stahlecker & Grill: *See*—
Grau, Gerhard; and Wieland, Rudolf, 5,035,027, Cl. 19-258.000.

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Klingner, Hartmut, 5,035,333, Cl. 211-41.000.

Spinelli, Harry J., to Du Pont de Nemours, E. I., and Company. Hybrid acrylic star polymers with polysiloxane cores. 5,036,139, Cl. 525-326.500.

Sporer, Josef: *See*—
Heisel, Michael; and Sporer, Josef, 5,035,810, Cl. 210-750.000.

Sports Licensing, Inc.: *See*—
Taylor, Joseph; Brine, William H., III; and Brine, Peter J., 5,035,434, Cl. 273-326.000.

Sprick, William L.: *See*—
Hudson, Gregory L.; Issa, Khaled M.; Richards, Randall R.; and Sprick, William L., 5,035,212, Cl. 123-323.000.

Spruill, David B.; Banyasz, Joseph L.; and Van Auken, Thomas V., to Philip Morris Management Corp. Device for controlling relative humidity within a substantially sealed container. 5,035,731, Cl. 55-387.000.

Sprung, Ralph D. Adjustable expanding rubber tire roller for paper scoring machinery. 5,035,037, Cl. 29-113.100.

Square D Company: *See*—
Krom, Thomas J.; and Casillo, Leonard G., 5,036,427, Cl. 361-339.000.

Squires, George A.: *See*—
Morris, Jerry R.; and Squires, George A., 5,035,025, Cl. 16-97.000.

SRI International: *See*—
Bartlett, Robert W.; Jorgensen, Paul J.; Allam, Ibrahim M.; and Rowcliffe, David J., 5,035,957, Cl. 428-552.000.

SSI Medical Services, Inc.: *See*—
Blanchard, Frederick W., 5,035,014, Cl. 5-424.000.

Stahl, Edward L., to Piper Industries of Texas, Inc. Multi-level basket. 5,035,326, Cl. 206-507.000.

Stallings, John P.: *See*—
Atwell, Ray W.; Favstritsky, Nicolai A.; Stallings, John P.; and Termine, Enrico J., 5,036,129, Cl. 524-278.000.

Stamhuis, Jan E.; Broekhuis, Antonius A.; and Luijk, Pieter, to Shell Oil Company. Elastomeric compositions, process for the preparation thereof and tires containing them. 5,036,138, Cl. 525-99.000.

Stamicarbon B.V.: *See*—
Bruinink, Peter; and Pessers, Wilhelmus A. R. M., 5,035,952, Cl. 428-461.000.
Hogenboom, Eric H. M.; and Bruinink, Peter, 5,035,111, Cl. 57-224.000.

Stanadyne Automotive Corp.: *See*—
Janik, Leon P., 5,035,797, Cl. 210-232.000.

Stanier, Peter W.: *See*—
Aldcroft, Derek; Newton, John R.; and Stanier, Peter W., 5,035,879, Cl. 424-49.000.

Staudinger, Gernot. Method of and apparatus for analyzing a suspension in a cuvette. 5,036,212, Cl. 250-575.000.

Steele, Dennis M.; and Steele, Diana C. Balloon anchor. 5,035,391, Cl. 248-346.000.

Steele, Diana C.: *See*—
Steele, Dennis M.; and Steele, Diana C., 5,035,391, Cl. 248-346.000.

Steffens, Norman L.: *See*—
Dinerman, Alex; and Steffens, Norman L., 5,035,605, Cl. 425-564.000.

Steffens, Ralf, to Leybold Aktiengesellschaft. Double-shaft vacuum pump with synchronization gears. 5,035,590, Cl. 418-206.000.

Steidl, Gary V.; Sabin, Cullen M.; and Thomas, Dennis A. Disposable food heater. 5,035,230, Cl. 126-263.000.

Stein, Andrew M.; and DeSantis, John A., to Six Corners Development Company. Automatic popcorn popping apparatus. 5,035,173, Cl. 99-323.700.

Stein, Herman H.; and Plattner, Jacob J., to Abbott Laboratories. Glaucoma treatment. 5,036,051, Cl. 514-18.000.

Steiner, Robert E.; and Soultanian, Daniel S., to Emerson Electric Co. Portable wet/dry vacuum cleaner and recharging base. 5,035,024, Cl. 15-339.000.

Steinhardt, Helmut; and Bieringer, Anton, to TRW Daut+Rietz GmbH & Co. Flat-contact receptacle. 5,035,661, Cl. 439-839.000.

Stella, Joseph B.: *See*—
Beeuwkes, Reinier, III; Stella, Joseph B.; and Salisbury, Thomas E., 5,035,420, Cl. 272-95.000.

Stelter, Eric C., to Eastman Kodak Company. Sequential development with magnetic and non-magnetic toner. 5,036,362, Cl. 355-245.000.

Stenger, Lawrence. Filtration vessel and end cap lock by a flexible rod. 5,035,798, Cl. 210-232.000.

Stening, Goran B.: *See*—
Johansson, Karl N. G.; Kovacs, Zsuzsanna M. I.; Lindborg, Bjorn G.; and Stening, Goran B., 5,036,071, Cl. 514-261.000.

Stephany, Thomas: *See*—
Lee, J. Kelly; Kriegel, Jon; and Stephany, Thomas, 5,035,415, Cl. 271-265.000.

Stephens, Vivian M.: *See*—
Sadeghi, Majid M.; and Stephens, Vivian M., 5,035,307, Cl. 188-372.000.

Stephenson, Robert C.: *See*—
Mazur, Robert G.; Stephenson, Robert C.; and Zier, Donald A., Jr., 5,036,271, Cl. 324-158.00P.

Stepnov, Sergei A.: *See*—
Arabei, Boris G.; Kostyrev, Sergei B.; Mints, Alexandr S.; Pronin, Lev A.; Ryzhonkov, Dmitry I.; Sopochkin, Sergei A.; Stepnov, Sergei A.; Esikman, Vladimir L.; Vasiliev, Andrei V.; and Kolgin, ALexandr P., 5,036,170, Cl. 219-10.410.

Stericycle, Inc.: *See*—
Held, Jeffery S.; and Sharp, James W., 5,035,858, Cl. 422-21.000.

Sterling, Steven M.: *See*—
Kowalczyk, Lawrence E.; Badesha, Santokh S.; Zukoski, Paul F.; Hordon, Monroe J.; Sterling, Steven M.; Lees, Barry A.; Elder, Frederick A.; and LaForce, Roger W., 5,035,857, Cl. 420-579.000.

Stevens, Rodney W.: *See*—
Kitaura, Yoshihiko; Ito, Fumitaka; Stevens, Rodney W.; and Asai, Nobuko, 5,036,088, Cl. 514-375.000.

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Finley, David A. J.; Carley, Peter M.; Stokes, James R.; and Napier, Robert C., 5,035,368, Cl. 241-212.000.

Stokes, William T. Transparent calculator for overhead projection. 5,035,502, Cl. 353-122.000.

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Daines, John W.; Benn, Bryan L.; and Stoll, Walter H., 5,035,411, Cl. 269-231.000.

Stone, Bernard D., to Addressease, Inc. Envelope printing mechanism. 5,035,521, Cl. 400-17.000.

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McCue, Richard H., Jr., 5,035,732, Cl. 62-24.000

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Qvarnstrom, Bengt G. L., 5,035,105, Cl. 53-448.000.

Storage Technology Corporation: *See*—
Burnett, Carl M.; and Wester, Karl.H., 5,035,627, Cl. 439-64.000.

Stork Pompen BV: *See*—
de Vries, Gerrit, 5,035,574, Cl. 415-200.000.

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Stowe, Gene B., to clnZall Corporation. Oil spill water treatment. 5,035,804, Cl. 210-671.000.
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Streett, James T., 5,035,038, Cl. 29-270.000.
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Stroze, Mark S.; and Durtschi, William G., to Sundstrand Corporation. Direct drive variable displacement hydraulic apparatus. 5,035,170, Cl. 91-486.000.
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Cowing, Richard W., 5,035,046, Cl. 29-714.000.
Stylex, Inc.: *See*—
Miller, Regis R., 5,035,470, Cl. 312-195.000.
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Downes, Robert W.; Smith, Wilson E.; Suciu, Ronald E.; and Wilson, Kenneth T., 5,036,514, Cl. 371-51.000.
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Yamada, Keiko; Suda, Mitsunobu; Kawashima, Ichirou; and Kitagawa, Nobuhiro, 5,035,413, Cl. 271-9.000.
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McGuire, Danny G.; McGuire, Damon C.; McGuire, Denver C.; and Sudberry, Mark E., 5,035,581, Cl. 417-36.000.
Sudo, Kenichi: *See*—
Igarashi, Toshio; Wakatsuki, Akira; Sudo, Kenichi; and Shida, Yuu, 5,036,124, Cl. 524-298.000.
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Suehiro, Masatoshi: *See*—
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Date, Yozo; and Tsumura, Toshihiro, 5,035,058, Cl. 30-387.000.
Sugamoto, Kazuomi: *See*—
Anderson, H. Clarke; and Sugamoto, Kazuomi, 5,035,901, Cl. 424-573.000.
Sugarman, Alan D.: *See*—
Prednis, Leonard J.; Proctor, Michael L.; and Sugarman, Alan D., 5,036,479, Cl. 364-580.000.
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Sugihara, Masanori: *See*—
Kobayashi, Kazuo; Yamada, Yoshinori; Morikawa, Kiyoshi; Kurumada, Masakazu; and Sugihara, Masanori, 5,036,509, Cl. 369-75.200.
Sugimoto, Hiroshi: *See*—
Ohishi, Toshiyuki; Abe, Yuji; Sugimoto, Hiroshi; Ohisuka, Kenichi; and Matsui, Teruhito, 5,036,372, Cl. 357-16.000.
Sugimoto, Yasuhiko: *See*—
Horita, Yoshiyuki; Nakayama, Kiyoshi; Sugimoto, Yasuhiko; Kikukawa, Norio; Yamaguchi, Yoshiharu; and Funakawa, Shigeru, 5,035,029, Cl. 24-394.000.
Sugino, Takao; Kawamura, Toshio; Asai, Masamichi; Yamada, Hiroshi; Mukoyama, Kenichi; Takahashi, Akira; and Hikima, Hiroshi, to Toshiba Ceramics Co., Ltd.; and Sumitomo Metal Indus., Ltd. Repairing material of a brick and a method of repairing a brick. 5,035,919, Cl. 427-140.000.
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Yamamoto, Yukio; and Sugiura, Masahiro, 5,035,081, Cl. 49-161.000.
Suguro, Kuniaki: *See*—
Tanaka, Shoji; Yamauchi, Hisao; Yamada, Yukio; Ohnuki, Masayoshi; Morita, Etsuji; Toyoshima, Mitsunobu; Wada, Yasuo; Hinoshita, Hirotaka; Ikeda, Wataru; Aihara, Etsuji; Kobayashi, Tutomu; and Suguro, Kuniaki, 5,035,597, Cl. 425-135.000.
Sullivan, James L., to Rockwell International Corporation. Excessive wear indicator for brake system. 5,035,303, Cl. 188-1.110.
Sulzer Brothers Limited: *See*—
Bucher, Robert, 5,035,268, Cl. 139-449.000.
Willert, Hans-Georg; Koch, Rudolf; and Burgi, Maxa, 5,035,714, Cl. 623-16.000.
Sumi, Kazuhiko: *See*—
Sakaue, Yoshikazu; Sumi, Kazuhiko; and Nakajima, Keiji, 5,036,544, Cl. 382-24.000.
Sumitani, Atsushi: *See*—
Hatamori, Osamu; Hata, Yoshiaki; Sumitani, Atsushi; Kobayashi, Haruo; and Kato, Kinya, 5,036,346, Cl. 354-195.120.
Sumitomo Chemical Company, Limited: *See*—
Igarashi, Toshio; Wakatsuki, Akira; Sudo, Kenichi; and Shida, Yuu, 5,036,124, Cl. 524-298.000.
Meki, Naoto, 5,036,158, Cl. 564-300.000.
Toyoshima, Yoshiki; Okada, Mitsuyuki; Fujii, Takeshi; Yamaguchi, Kentaro; and Tsuji, Mitsuji, 5,036,141, Cl. 525-286.000.
Sumitomo Electric Industries, Ltd.: *See*—
Ishiguro, Yoichi; Ooe, Masaharu; Kobayashi, Kohei; Tanaka, Gotaro; and Watanabe, Minoru, 5,035,484, Cl. 350-96.300.
Nishiguchi, Masanori; Sekiguchi, Takeshi; Miyoshi, Ikkei; and Nishio, Kiyoshi, 5,035,087, Cl. 51-131.100.
Yamakawa, Akira; Sakanoue, Hitoyuki; and Takeuchi, Hisao, 5,036,026, Cl. 501-96.000.
Sumitomo Light Metal Industries, Ltd.: *See*—
Kisaragi, Takayasu; and Shirasaka, Yuichi, 5,035,730, Cl. 55-269.000.
Sumitomo Metal Indus., Ltd.: *See*—
Sugino, Takao; Kawamura, Toshio; Asai, Masamichi; Yamada, Hiroshi; Mukoyama, Kenichi; Takahashi, Akira; and Hikima, Hiroshi, 5,035,919, Cl. 427-140.000.
Sumitomo Presicion Products Co. Ltd.: *See*—
Oya, Junichi; and Kashima, Shoichi, 5,035,284, Cl. 165-146.000.
Sumitomo Rubber Industries, Ltd.: *See*—
Soeda, Koji; Kubota, Yoshiya; Okamoto, Shoji; Kubota, Akinori; Kobayashi, Michihito; Ijiri, Masaaki; Ozawa, Susumu; Tomosada, Kiyoshi; Irie, Nobuhiko; Hasegawa, Akira; Katayama, Hideaki; Murakami, Toshifumi; and Sakaguchi, Katsuyoshi, 5,035,591, Cl. 425-40.000.
Sundquist, Douglas F.: *See*—
Filion, Joseph L.; Sundquist, Douglas F.; Schmitt, Paul F.; Evanitsky, Eugene S.; and Warddrip, Riley L., 5,036,361, Cl. 355-209.000.
Sundstrand Corporation: *See*—
Dhyanchand, John J.; and Nguyen, Vietson M., 5,036,449, Cl. 363-15.000.
Markunas, Albert L.; and Rozman, Gregory I., 5,036,267, Cl. 322-10.000.
Rozman, Christopher J.; Recker, Bradley J.; and Roe, Derrick I., 5,036,451, Cl. 363-41.000.
Spencer, William M.; and Breit, Joseph S., 5,036,448, Cl. 363-2.000.
Stroze, Mark S.; and Durtschi, William G., 5,035,170, Cl. 91-486.000.
Sung, Rodney L.; and Kaufman, Benjamin J., to Texaco Inc. Middle distillate containing storage stability additive. 5,035,719, Cl. 44-334.000.
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Mori, Shigeki; and Yokosuka, Naomi, 5,035,880, Cl. 424-54.000.
Mori, Shigeki; and Makino, Chiho, 5,035,881, Cl. 424-54.000.
Sunwell Engineering Company Ltd.: *See*—
Goldstein, Vladimir, 5,035,733, Cl. 62-541.000.
Surface Combustion, Inc.: *See*—
Hoetzl, Max; and Lingle, Thomas M., 5,035,610, Cl. 432-77.000.
Suthar, Mukesh B.: *See*—
Tonnu, Thao T.; Suthar, Mukesh B.; and Kaseff, Charles A., 5,036,226, Cl. 307-475.000.
Suto, Mark J., to Warner-Lambert Company. 2-oxazolidinone derivatives of nitroimidazoles and pharmaceutical compositions useful as sensitizing agents. 5,036,089, Cl. 514-376.000.
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Sutter, Hubert: *See*—
Obrecht, Werner; Szentivanyi, Szolt; Sutter, Hubert; Herwig, Jens; and Kolwert, Alois, 5,036,149, Cl. 526-323.200.
Sutton, Leroy A.; and Phoenix, Norman E., to Zenith Electronics Corporation. Dynamic focus system for CRT display. 5,036,259, Cl. 315-382.000.
Suwala, David W., to GAF Chemicals Corporation. Paint removing compositions. 5,035,829, Cl. 252-170.000.
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Yamada, Taiji, 5,035,397, Cl. 248-638.000.
Suzuki, Kunio; Abe, Masayoshi; Kinka, Mikio; Arai, Yasuyuki; Satake, Akemi; Nishi, Kazuo; Kugawa, Shuichi; and Ishida, Noriya, to Semiconductor Energy Laboratory Co., Ltd. Photoelectric conversion device. 5,035,753, Cl. 136-249.000.
Suzuki, Makoto; and Tanaka, Hiroshi, to Toyota Jidosha Kabushiki Kaisha. Method and apparatus for determining high temperature state of air-fuel ratio sensor. 5,036,470, Cl. 364-431.060.
Suzuki, Noboru; Toji, Shigeo; and Kawasaki, Masahiro, to Asahi Kogaku Kogyo Kabushiki Kaisha. Autofocusing system for camera. 5,036,349, Cl. 354-402.000.
Suzuki, Seiji: *See*—
Hirano, Shigeo; Murai, Ashita; and Suzuki, Seiji, 5,035,993, Cl. 430-598.000.
Suzuki, Teruo; Ogawa, Kenichi; and Murakami, Hiroshi, to Agency of Industrial Science and Technology; and Seiko Instruments Inc. Method of manufacturing a platinum tip. 5,035,780, Cl. 204-129.350.
Suzuki, Toshio, to Toybox Corporation. Push pin puzzle with internal locking mechanism. 5,035,430, Cl. 273-153.00S.
Suzuki, Tsuyoshi: *See*—
Matsuo, Takao; Odaka, Hiroyuki; Suzuki, Tsuyoshi; and Tsuda, Masao, 5,036,081, Cl. 514-336.000.
Suzuki, Yoshio; and Hiramatsu, Michio, to Nippondenso Co., Ltd. Method of assembling a heat exchanger including a method of determining values of parameters in a heat exchanger, and determining whether the efficiency of the heat exchanger is acceptable. 5,035,052, Cl. 29-890.046.
Swann, James C.: *See*—
Hollberg, Peter J.; and Swann, James C., 5,035,773, Cl. 162-347.000.
Swanson, Brian E.: *See*—
Kalinowski, Paul W.; Ramakrishnan, Muni S.; Rue, Charles V.; Sheldon, David A.; and Swanson, Brian E., 5,035,723, Cl. 51-309.000.
Switzer, Jeffrey K.: *See*—
White, Robert T.; Liebig, Thomas J.; and Switzer, Jeffrey K., 5,035,133, Cl. 72-350.000.
Symes, Kenneth C.: *See*—
Langley, John; Symes, Kenneth C.; and Holm, Peter, 5,035,900, Cl. 424-484.000.

Syntex (U.S.A.) Inc.: *See*—
Runkel, Richard A.; and Lee, Jung-Chung, 5,035,891, Cl. 424-423.000.
Synthes (U.S.A.): *See*—
Frigg, Robert, 5,035,697, Cl. 606-67.000.
Szentivanyi, Szolt: *See*—
Obrecht, Werner; Szentivanyi, Szolt; Sutter, Hubert; Herwig, Jens; and Kolwert, Alois, 5,036,149, Cl. 526-323.200.
Szucs, Johan. Apparatus and method for cleaning stone and metal surfaces. 5,035,090, Cl. 51-439.000.
T.G.N. S.p.A.: *See*—
Carlo, Gatti; and Daniele, Zetti, 5,035,026, Cl. 16-288.000.
Tabata, Toshiyuki: *See*—
Takeguchi, Hajime; Tabata, Toshiyuki; and Ishiyama, Tatsuro, 5,035,407, Cl. 267-140.100.
Tachi-S Co., Ltd.: *See*—
Hanai, Toshimichi; Nagashima, Hideyuki; and Fujita, Yasuyuki, 5,035,465, Cl. 297-238.000.
Tada, Masuo; Hata, Takeki; Fukumoto, Takaaki; and Ohmori, Toshiaki, to Taiyo Sanso Co., Ltd.; and Mitsubishi Denki Kabushiki Kaisha. Processing method for semiconductor wafers. 5,035,750, Cl. 134-7.000.
Taga, Genji; Noritake, Masaki; Nakamura, Masahiro; and Zhang, Hua-Min, to Tokuyama Soda Kabushiki Kaisha. Process for preparation of alkaline earth metal aluminosilicate sintered body. 5,036,030, Cl. 501-125.000.
Taguchi, Fumiaki; Mitsui, Isamu; Hara, Kinichi; Hayashi, Masaro; Ezawa, Kunio; Fukunaga, Kenichi; and Kuranari, Jun, to Calpis Food Industry Co., Ltd.; and Taguchi, Fumiaki. Test method involving substance-conjugated complement component C1q. 5,035,995, Cl. 435-4.000.
Taguchi, Hiroaki; Katsushima, Takeo; Ban, Masakazu; Takahashi, Mitsuru; Shinoda, Kiyotaka; and Watanabe, Akihiko, to Toyo Boseki Kabushiki Kaisha. Novel benzothiazole derivatives. 5,036,086, Cl. 514-367.000.
Taheri, Syde A. Method and apparatus for providing an anastomosis. 5,035,702, Cl. 606-153.000.
Taiho Pharmaceutical Company, Limited: *See*—
Ogawa, Kazuo; and Matsushita, Yoh-ichi, 5,036,065, Cl. 514-211.000.
Taiyo Corporation: *See*—
Tanaka, Shoji; Yamauchi, Hisao; Yamada, Yukio; Ohnuki, Masayoshi; Morita, Etsuji; Toyoshima, Mitsunobu; Wada, Yasuo; Hinoshita, Hirotaka; Ikeda, Wataru; Aihara, Etsuji; Kobayashi, Tutomu; and Suguro, Kuniaki, 5,035,597, Cl. 425-135.000.
Taiyo Sanso Co., Ltd.: *See*—
Tada, Masuo; Hata, Takeki; Fukumoto, Takaaki; and Ohmori, Toshiaki, 5,035,750, Cl. 134-7.000.
Tajima, Masaaki, to Mitsubishi Denki Kabushiki Kaisha. Rotor of salient-pole type rotary machine. 5,036,238, Cl. 310-214.000.
Takada, Nobuo. Rolling-contact bearing type clutch. 5,035,309, Cl. 192-45.000.
Takagi, Kotaro: *See*—
Takao, Nobutaka; Yokoya, Satoshi; and Takagi, Kotaro, 5,036,301, Cl. 333-185.000.
Takagishi, Takashi: *See*—
Nakazato, Wataru; Muraoka, Kunihiko; Inaba, Shigemitsu; Ohtaka, Kazuto; and Takagishi, Takashi, 5,035,644, Cl. 439-372.000.
Takahashi, Akira: *See*—
Sugino, Takao; Kawamura, Toshio; Asai, Masamichi; Yamada, Hiroshi; Mukoyama, Kenichi; Takahashi, Akira; and Hikima, Hiroshi, 5,035,919, Cl. 427-140.000.
Takahashi, Hiroshi: *See*—
Ema, Hidetoshi; and Takahashi, Hiroshi, 5,036,519, Cl. 372-38.000.
Takahashi, Kenichi: *See*—
Harigane, Kotaro; Takahashi, Kenichi; and Honda, Hiroaki, 5,035,047, Cl. 29-740.000.
Takahashi, Mitsuru: *See*—
Taguchi, Hiroaki; Katsushima, Takeo; Ban, Masakazu; Takahashi, Mitsuru; Shinoda, Kiyotaka; and Watanabe, Akihiko, 5,036,086, Cl. 514-367.000.
Takahashi, Ryoichi: *See*—
Sugi, Hideo; Sekikawa, Ayako; and Takahashi, Ryoichi, 5,036,087, Cl. 514-372.000.
Takahashi, Ryuichi; and Nakamura, Taku, to Fuji Photo Film Co., Ltd. Light-sensitive material containing silver halide reducing agent and polymerizable compound. 5,035,975, Cl. 430-138.000.
Takahashi, Shinji: *See*—
Adachi, Kazumasa; Takahashi, Shinji; and Hirabayashi, Kimitaka, 5,036,431, Cl. 361-412.000.
Takahashi, Shoji; and Miyamoto, Kouichi, to Ryobi Ltd. Hand-held scroll saw. 5,035,059, Cl. 30-392.000.
Takahashi, Takao: *See*—
Sonobe, Tadasi; Katane, Mamoru; Ikeguchi, Takashi; Matsumoto, Manabu; Ueda, Shinjiro; Kobari, Toshiaki; Takahashi, Takao; Hayasaka, Toa; and Kitayama, Toyoki, 5,036,290, Cl. 328-235.000.
Takahashi, Toshihisa: *See*—
Uchinami, Masanobu; and Takahashi, Toshihisa, 5,035,220, Cl. 123-436.000.
Takahashi, Toshio: *See*—
Kawabata, Yasukazu; Hamaguchi, Susumu; Takahashi, Toshio; Yokota, Hiroshi; and Shibayama, Katsutoshi, 5,035,318, Cl. 198-779.000.
Takahashi, Yutaka: *See*—
Gillies, Duncan F.; Khan, Gul N.; and Takahashi, Yutaka, 5,036,464, Cl. 364-413.130.
Takahira, Kenichi; Yamaguchi, Atsuo; Furuta, Shigeru; Inoue, Takesi; Matsubara, Toshiyuki; and Fujioka, Shuzo, to Mitsubishi Denki Kabushiki Kaisha. Microprocessor having miswriting preventing function. 5,036,460, Cl. 364-200.000.
Takamura, Hiromi; Kamegai, Jun; and Hirota, Hajime, to KAO Corporation. Mild liquid aqueous detergent compositions containing an alkylsaccharide surface active agent and a silicone derivative. 5,035,832, Cl. 252-174.150.
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, to Victor Company of Japan, Ltd. Apparatus for detecting electrostatic surface potential. 5,036,270, Cl. 324-96.000.
Takano, Norihisa: *See*—
Tateishi, Yosuke; Takano, Norihisa; and Hashimoto, Kenji, 5,035,512, Cl. 374-142.000.
Takao, Nobutaka; Yokoya, Satoshi; and Takagi, Kotaro, to Sony Corporation. Filter apparatus. 5,036,301, Cl. 333-185.000.
Takaoka, Hideo: *See*—
Baba, Shigeo; Shibata, Yukio; Kawamura, Takahiro; Takaoka, Hideo; Kimura, Tsuguo; Kousaka, Kazuo; Minato, Yoshihiro; Yokoyama, Naruo; Iida, Kozo; and Imai, Tetsuya, 5,036,035, Cl. 502-221.000.
Takayama, Shuichi: *See*—
Kubokawa, Hiroaki; Tsukaya, Takashi; Ueda, Yasuhiro; Ohshima, Yutaka; Nakamura, Takeaki; Hibino, Hiroki; Takayama, Shuichi; and Hagino, Tadao, 5,035,231, Cl. 128-6.000.
Takayama, Yukio: *See*—
Yonese, Naoki; Nakamura, Mikio; Kawamura, Masato; and Takayama, Yukio, 5,035,954, Cl. 428-500.000.
Takeda Chemical Industries, Ltd.: *See*—
Matsuo, Takao; Odaka, Hiroyuki; Suzuki, Tsuyoshi; and Tsuda, Masao, 5,036,081, Cl. 514-336.000.
Takeda, Junichi; and Yoshizuka, Haruo, to Kabushiki Kaisha Ishikawa Seisakusho Ltd. Folding device in a corrugated cardboard box making machine. 5,035,683, Cl. 493-23.000.
Takeda, Neiji: *See*—
Kanno, Nobumori; Ishii, Kunio; Takeda, Neiji; and Nihashi, Hiroyuki, 5,035,953, Cl. 428-484.000.
Takeguchi, Hajime; Tabata, Toshiyuki; and Ishiyama, Tatsuro, to Nissan Motor Co., Ltd.; and Bridgestone Corporation. Fluid-filled power unit mount. 5,035,407, Cl. 267-140.100.
Takeshita, Fusayuki: *See*—
Kozaki, Shyuichi; Okada, Masako; Funada, Fumiaki; Sasaki, Kei; Saito, Hideo; and Takeshita, Fusayuki, 5,035,928, Cl. 428-1.000.
Takeuchi, Hisao: *See*—
Yamakawa, Akira; Sakanoue, Hitoyuki; and Takeuchi, Hisao, 5,036,026, Cl. 501-96.000.
Takeuchi, Kanji; Setaka, Yousuke; and Arita, Satoshi, to Nippondenso Co., Ltd. Throttle valve control apparatus for vehicles. 5,035,218, Cl. 123-361.000.
Takeuchi, Kousuke: *See*—
Sakata, Masakazu; Shibata, Kenichi; Takeuchi, Kousuke; Tanaka, Toshiharu; Okano, Hiroshi; Tsujino, Toshikazu; and Kuroki, Kazuhiko, 5,036,199, Cl. 250-351.000.
Takii, Yasuo; and Fujino, Hitoshi, to Alps Electric Co., Ltd. Illumination type keytop. 5,036,440, Cl. 362-95.000.
Takino, Hiroaki: *See*—
Majima, Eiji; Takino, Hiroaki; Izawa, Kunisuke; Yokozeki, Kenzo; and Kubota, Koji, 5,036,004, Cl. 435-116.000.
Takita, Nagon; and Noguchi, Yoshihiro, to Riso Kagaku Corporation. Mimeographic printing apparatus and clamping device therefor. 5,035,175, Cl. 101-116.000.
Tam, Steve Y.: *See*—
Hsu, Ming-Chu; and Tam, Steve Y., 5,036,101, Cl. 514-423.000.
Tammela, Simo: *See*—
Honkanen, Seppo; Tammela, Simo; and Tervonen, Ari, 5,035,734, Cl. 65-30.130.
Tamura, Hideharu; and Ogawa, Kazufumi, to Matsushita Electric Industrial Co., Ltd. Method for the formation of monomolecular adsorption films or built-up films of monomolecular layers using silane compounds having an acetylene or diacetylene bond. 5,035,782, Cl. 204-157.600.
Tamura, Kohji; Omure, Yukio; and Ide, Satoshi, to Daikin Industries, Ltd. Solvents containing dichlorotetrafluoropropane. 5,035,828, Cl. 252-170.000.
Tamura, Koji; Kashiwagi, Hiroshi; and Noguchi, Masahiro, to Daikin Industries, Ltd. Refrigerant compositions of 1,11-trifluoroethane. 5,035,823, Cl. 252-67.000.
Tamura, Tatsuya: *See*—
Ohtake, Shinichi; and Tamura, Tatsuya, 5,035,096, Cl. 52-208.000.
Tamura, Yutaka; Hosokawa, Yoshio; Noro, Satoshi; and Kondo, Kazuhiko, to Sanyo Electric Co., Ltd. Apparatus for road path searching applicable to car navigation system and operation method thereof. 5,036,471, Cl. 364-449.000.
Tanaka, Gotaro: *See*—
Ishiguro, Yoichi; Ooe, Masaharu; Kobayashi, Kohei; Tanaka, Gotaro; and Watanabe, Minoru, 5,035,484, Cl. 350-96.300.
Tanaka, Hiroshi: *See*—
Suzuki, Makoto; and Tanaka, Hiroshi, 5,036,470, Cl. 364-431.060.
Tanaka, Katsumasa; Satoh, Hitoshi; Kawakami, Heijiro; and Marukawa, Nobuaki, to Kabushiki Kaisha Kobe Seiko Sho. Method for processing a vibratory surface. 5,035,752, Cl. 134-32.000.

Tanaka, Kazuyoshi: *See*—
Ueno, Kouhei; and Tanaka, Kazuyoshi, 5,036,127, Cl. 524-423.000.
Tanaka Kikinzoku Kogyo K.K.: *See*—
Furuya, Nagakazu, 5,035,869, Cl. 423-253.000.
Tanaka, Osamu, to Minolta Camera Kabushiki Kaisha. Zooming operation apparatus of zoom lens. 5,035,493, Cl. 350-429.000.
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DeLuca, Hector F.; Schnoes, Heinrich K.; Sicinski, Rafal R.; and Tanaka, Yoko, 5,036,061, Cl. 514-167.000.
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Atwood, John G., 5,036,455, Cl. 364-200.000.
Le, Duc N.; Yue, Lordson L.; Costantino, Cirillo L.; Chengson, David P.; and Khan, Aurangzeb K., 5,036,528, Cl. 375-119.000.
Tandy Corporation: *See*—
Goldberg, Paul R.; Clark, Bryan K.; Finegan, Joel D.; and Guerra, Robert, 5,036,511, Cl. 369-284.000.
Tanguy, Christian; Mesquida, Guy; and Marquebielle, Gerard-Maurice, to Thomson Hybrides. Semiconductor laser with localization of current. 5,036,522, Cl. 372-46.000.
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Asakawa, Shiro; Machida, Yasuhiko; Taomoto, Akira; and Nichogi, Katsuhiro, 5,035,835, Cl. 252-500.000.
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Lyon, Russell R.; and Tash, Alan S., 5,035,692, Cl. 606-143.000.
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Shibata, Masanori; Yamamoto, Masaru; Okimoto, Haruo; and Tashima, Seiji, 5,035,114, Cl. 60-612.000.
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Fang, Roger C., 5,035,728, Cl. 55-106.000.
Taylor, Beverly W., to Handi-Pac, Inc. Light stake. 5,036,447, Cl. 362-431.000.
Taylor, Joseph; Brine, William H., III; and Brine, Peter J., to Sports Licensing, Inc. Lacrosse stick head with bulged side walls. 5,035,434, Cl. 273-326.000.
Taylor, Stephen C., to Imperial Chemical Industries PLC. Biochemical process. 5,036,009, Cl. 435-253.300.
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Harigane, Kotaro; Takahashi, Kenichi; and Honda, Hiroaki, 5,035,047, Cl. 29-740.000.
Kaneda, Hiroshi; and Ikebe, Masaru, 5,036,421, Cl. 360-133.000.
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Buchelt, Benno E., 5,035,377, Cl. 244-12.100.
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Tegeler, John J.: *See*—
Hrib, Nicholas J.; Shoger, Kirk D.; and Tegeler, John J., 5,036,152, Cl. 544-57.000.
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Teikoku Hume Pipe Co., Ltd.: *See*—
Yoshikawa, Nobuyoshi; and Asano, Hiroshi, 5,035,850, Cl. 264-256.000.
Teisseire, Bernard, to Adir et Compagnie. Use of 2-azabicyclo[2.2.2]octane-3-carboxylic acid derivatives for the treatment of migraine. 5,036,076, Cl. 514-299.000.
Tektronix, Inc.: *See*—
Burke, Edward F., 5,036,266, Cl. 318-646.000.
Buzak, Thomas S., 5,036,317, Cl. 340-783.000.
Tel Kyushu Limited: *See*—
Moriyama, Masashi; Yamahira, Yutaka; and Matsuyama, Yuji, 5,035,200, Cl. 118-693.000.
Telefunken Electronic GmbH: *See*—
Rothermel, Albrecht, 5,036,233, Cl. 307-570.000.
Telephonics Corporation: *See*—
Oken, Stanley; Vemula, Rao; and Lee, Eugene, 5,036,538, Cl. 381-43.000.
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Kurtz, Karl-Rudolf; Koch, Horst; Telser, Thomas; and Bach, Helmut, 5,035,981, Cl. 430-327.000.
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Nakajima, Sadaaki; and Terakawa, Taiju, 5,035,595, Cl. 425-131.500.
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Aoki, Takashi; Terayama, Satoshi; and Miyake, Junichi, 5,035,157, Cl. 74-866.000.
Termine, Enrico J.: *See*—
Atwell, Ray W.; Favstritsky, Nicolai A.; Stallings, John P.; and Termine, Enrico J., 5,036,129, Cl. 524-278.000.
Terronics Development Corporation: *See*—
Escallon, Eduardo C., 5,035,364, Cl. 241-5.000.
Terumo Kabushiki Kaisha: *See*—
Inaba, Fumiaki; and Inoue, Satoshi, 5,035,865, Cl. 422-99.000.
Tervonen, Ari: *See*—
Honkanen, Seppo; Tammela, Simo; and Tervonen, Ari, 5,035,734, Cl. 65-30.130.
Teschemacher, Peter: *See*—
Stotzer, Erwin E.; and Teschemacher, Peter, 5,035,071, Cl. 37-94.000.
Testin, William J., to Thomson Consumer Electronics, Inc. Standby/-run power supply and control circuit. 5,036,261, Cl. 315-411.000.
Texaco Inc.: *See*—
Chien, Sze-Foo, 5,035,146, Cl. 73-861.040.
Davis, Lorne A., Jr.; Hart, Timothy J.; Moss, Robert M.; and Pepin, Gregory P., 5,036,193, Cl. 250-255.000.
DeRosa, Thomas F.; Kaufman, Benjamin J.; and Jennejahn, Rosemary J., 5,035,819, Cl. 252-49.900.
Kieke, Dan E.; and Naae, Douglas G., 5,035,288, Cl. 166-274.000.
Muan, Arnulf; and Najjar, Mitri S., 5,036,038, Cl. 502-335.000.
Sung, Rodney L.; and Kaufman, Benjamin J., 5,035,719, Cl. 44-334.000.
Texas Instrument Incorporated: *See*—
Tigelaar, Howard L., 5,036,020, Cl. 437-60.000.
Texas Instruments Deutschland GmbH: *See*—
Jungert, Horst A.; and Muller, Manfred H., 5,036,232, Cl. 307-542.000.
Texas Instruments Incorporated: *See*—
Brucculeri, Louis S.; and Giddings, James N., 5,036,221, Cl. 307-443.000.
Mitchell, Allan T., 5,036,375, Cl. 357-235.000.
Pathak, Vijay K.; and Cotton, David R., 5,036,377, Cl. 357-38.000.
Renner, Karl; and Shanklin, John P., 5,036,453, Cl. 364-200.000.
Teherani, Towfik H.; and Little, D. Dawn, 5,036,376, Cl. 357-30.000.
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Leuchtenmuller, Rudolf; Kapeller, Manfred; and Schoberger, Johann, 5,035,033, Cl. 28-115.000.
Thangavelu, Kandasamy, to Otis Elevator Company. "Artificial Intelligence" based learning system predicting "Peak-Period" times for elevator dispatching. 5,035,302, Cl. 187-125.000.
Thau, Wolfgang, to KTM Locks CMT Group Division of Magna International Inc. Connector with lockable bushing. 5,035,528, Cl. 403-290.000.
Theobald, Kevin B., to CODEX Corp. Compact expandable folded first-in-first-out queue. 5,036,489, Cl. 365-73.000.
Therabite Corporation: *See*—
Beeuwkes, Reinier, III; Stella, Joseph B.; and Salisbury, Thomas E., 5,035,420, Cl. 272-95.000.
Thermal Technologies, Inc.: *See*—
Newman, William H., 5,035,514, Cl. 374-164.000.
Thibaudeau, Thomas P.: *See*—
Pukari, Vimal K.; Paille, Norman I., Jr.; Thibaudeau, Thomas P.; and Khaund, Arup K., 5,035,724, Cl. 51-309.000.
Thiokol Corporation: *See*—
Somoza, Carlos, 5,035,363, Cl. 241-1.000.
Thoma, Endre P.: *See*—
Busch, Robert E.; Hovis, William P.; Redman, Theodore M.; Thoma, Endre P.; and Yankosky, James A., 5,036,495, Cl. 365-233.000.
Thomas, David A.; O'Connell, Robert M.; Reinert, Robert C.; and Gillin, John M., to Philip Morris Incorporated. Overwrap insert. 5,035,935, Cl. 428-43.000.
Thomas, Delmer L., to Datron Systems Incorporated. Multi-mode feed system for a monopulse antenna. 5,036,332, Cl. 342-361.000.
Thomas, Dennis A.: *See*—
Steidl, Gary V.; Sabin, Cullen M.; and Thomas, Dennis A., 5,035,230, Cl. 126-263.000.

Thomas Jefferson University: *See*—
Alchas, Paul G.; Augello, Frank A.; Brooks, Christopher J.; Cutshall, Tony A.; DiPisa, Joseph A., Jr.; Williams, Stuart K.; Gabel, Jonathan B.; Mulhauser, Paul J.; Prais, Wes; Jarrell, Bruce E.; and Rose, Deborah G., 5,035,708, Cl. 623-1.000.

Thomas, Peter M.: *See*—
Dautremont-Smith, William C.; Katz, Avishay; Koszi, Louis A.; Segner, Bryan P.; and Thomas, Peter M., 5,036,023, Cl. 437-184.000.

Thomson Consumer Electronics: *See*—
Auvray, Eric; and Perron, Claude, 5,036,391, Cl. 358-133.000.

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George, John B., 5,036,260, Cl. 315-384.000.
Norman, Marvin N.; Smith, Lawrence E.; and Knight, Peter R., 5,036,257, Cl. 315-381.000.
Testin, William J., 5,036,261, Cl. 315-411.000.

Thomson-CSF: *See*—
Andrieu, Jean-Pierre; Gault, Dominique; and Henri, Jean-Claude, 5,036,326, Cl. 342-176.000.
Bouko, Jean; and Roger, Joseph, 5,036,336, Cl. 343-789.000.
Van Cappel, Dominique, 5,036,498, Cl. 367-125.000.

Thomson Hybrides: *See*—
Tanguy, Christian; Mesquida, Guy; and Marquebielle, Gerard-Maurice, 5,036,522, Cl. 372-46.000.

Thorn EMI Electronics Limited: *See*—
Voles, Roger, 5,036,197, Cl. 250-332.000.

Thorner, Michael O., to University of Virginia Alumni Patents Foundation, The. Method for increasing growth hormone secretion. 5,036,045, Cl. 514-12.000.

Thornton, Roy F.: *See*—
Levinson, Lionel M.; Brown, Dale M.; and Thornton, Roy F., 5,035,964, Cl. 429-120.000.

Tibbals, E. C., Jr. Circular weft knitting machine. 5,035,124, Cl. 66-120.000.

Tiemeyer, Michael: *See*—
Brandley, Brian K.; and Tiemeyer, Michael, 5,035,786, Cl. 204-182.100.

Tigelaar, Howard L., to Texas Instrument Incorporated. Method of fabricating microelectronic device incorporating capacitor having lowered topographical profile. 5,036,020, Cl. 437-60.000.

Tikhtman, Jacob: *See*—
Huber, James V.; Patel, Bhakti S.; and Tikhtman, Jacob, 5,036,242, Cl. 313-35.000.

Tillman, William R.; and Pauli, Robert A., to Pauli & Griffin. Blast media recovery and cleaning system. 5,035,089, Cl. 51-425.000.

Timmerman, Marsha W.: *See*—
Palmer, John L.; and Timmerman, Marsha W., 5,036,000, Cl. 435-26.000.

Timmons, Sarah J. Valved nipple for baby bottle. 5,035,340, Cl. 215-11.400.

Ting, Tah-Kang J.: *See*—
Lu, Chih-Yuan; and Ting, Tah-Kang J., 5,036,378, Cl. 357-23.500.

Tingley, Eugene H.: *See*—
Honkomp, Glenn A.; Tingley, Eugene H.; McNay, Thomas O.; and Bowsky, Benjamin, 5,035,653, Cl. 439-622.000.

Tioxide Group Plc: *See*—
Chip, Gerald K.; and Rudin, Alfred, 5,036,109, Cl. 521-57.000.

Tischler, Michael A.: *See*—
Kuech, Thomas F.; and Tischler, Michael A., 5,036,022, Cl. 437-81.000.

Titus, Paul E., to Shell Oil Company. Reduced J-tube riser pull force. 5,035,922, Cl. 427-239.000.

Tjoe, Sioe-Heng A.: *See*—
Debroy, Tapan K.; Chung, Ding Y.; Tjoe, Sioe-Heng A.; and Deschner, Craig R., 5,035,785, Cl. 204-181.700.

To Market, Two Markets, Inc.: *See*—
Sky, Phillip, 5,035,913, Cl. 426-619.000.

Toa Grout Kogyo Kabushiki Kaishi: *See*—
Kawafuji, Takayuki; Akesaka, Toshio; and Ooka, Sinkiti, 5,035,539, Cl. 405-154.000.

Tobe, Hayato: *See*—
Tsukada, Masamichi; and Tobe, Hayato, 5,035,505, Cl. 356-319.000.

Tobler, Hans; Ackermann, Peter; and Nyfeler, Robert, to Ciba-Geigy Corporation. Certain 1-(3-pyridyl)-2-phenoxy-alkanones having antimicrobial activity. 5,036,084, Cl. 514-355.000.

Toda, Kunio; Yokoyama, Tomoaki; and Nagao, Taisuke, to Minolta Camera Kabushiki Kaisha. Image forming apparatus. 5,036,369, Cl. 355-298.000.

Toensing, Eyvand E., to Seagate Technology, Inc. Method for removing ball staked head gimbal assembly. 5,035,044, Cl. 29-603.000.

Toji, Shigeo: *See*—
Suzuki, Noboru; Toji, Shigeo; and Kawasaki, Masahiro, 5,036,349, Cl. 354-402.000.

Tokai Kogyo Kabushiki Kaisha: *See*—
Yada, Yukihiko, 5,035,459, Cl. 296-93.000.

Tokico Ltd.: *See*—
Ashiba, Masahiro, 5,035,306, Cl. 188-299.000.

Tokuda, Shuichirou; Furukawa, Noriyuki; and Kawai, Yoshinori, to Mitsubishi Rayon Company, Ltd. Illumination panel. 5,036,435, Cl. 362-31.000.

Tokunaga, Akio; and Hayashi, Toshiaki, to Japan Storage Battery Co., Ltd. Sealed lead-acid battery. 5,035,966, Cl. 429-130.000.

Tokunaga, Ichiro: *See*—
Kamigaki, Tomoo; Tokunaga, Ichiro; Yanagita, Satoshi; and Hayasaka, Koro, 5,035,960, Cl. 428-694.000.

Tokuyama Soda Kabushiki Kaisha: *See*—
Taga, Genji; Noritake, Masaki; Nakamura, Masahiro; and Zhang, Hua-Min, 5,036,030, Cl. 501-125.000.

Tokyo Electron Limited: *See*—
Moriyama, Masashi; Yamahira, Yutaka; and Matsuyama, Yuji, 5,035,200, Cl. 118-693.000.

Tokyo Parts Electronic Co., Ltd.: *See*—
Yamaguchi, Tadao, 5,036,239, Cl. 310-268.000.

Tokyo Sintered Metals Corp.: *See*—
Harabayashi, Masao, 5,035,418, Cl. 272-73.000.

Tolan, Peter J.: *See*—
Baird, William E.; and Tolan, Peter J., 5,035,141, Cl. 73-296.000.

Tolivaisa, John: *See*—
Settlemier, Brock R.; Bone, Steven R.; Tolivaisa, John; and Nugent, James E., 5,035,395, Cl. 248-634.000.

Tomanovits, John, to Phillip Morris Incorporated. Methods and apparatus for applying C-shaped innerframes to cigarette bundles. 5,035,102, Cl. 53-397.000.

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Lam, King S.; Mattei, Jacqueline; Leet, John E.; Matson, James A.; Tomita, Koji; and Kaplan, Murray A., 5,036,010, Cl. 435-253.500.
Ohkuma, Hiroaki; Tomita, Koji; Konishi, Masataka; and Kamei, Hideo, 5,036,008, Cl. 435-252.100.

Tomita, Toshihiko, to Pioneer Electronic Corporation. Disc recording and/or playback apparatus with automatic changer. 5,036,503, Cl. 369-36.000.

Tomiyama, Takeshi; Hashimoto, Sadaaki; and Murase, Heihachi, to Kansai Paint Company, Limited. Adhesive sheet for preventing icing. 5,035,934, Cl. 428-40.000.

Tomosada, Kiyoshi: *See*—
Soeda, Koji; Kubota, Yoshiya; Okamoto, Shoji; Kubota, Akinori; Kobayashi, Michihito; Ijiri, Masaaki; Ozawa, Susumu; Tomosada, Kiyoshi; Irie, Nobuhiko; Hasegawa, Akira; Katayama, Hideaki; Murakami, Toshifumi; and Sakaguchi, Katsuyoshi, 5,035,591, Cl. 425-40.000.

Tompkins, David J., to Kontron Instruments Holdings, N.V. Pipetting method. 5,035,150, Cl. 73-864.150.

Tonnu, Thao T.; Suthar, Mukesh B.; and Kaseff, Charles A., to NCR Corporation. Signal converting circuit. 5,036,226, Cl. 307-475.000.

Tonomoto, Yoshihiro: *See*—
Iida, Masaru; Iwamasa, Akiyoshi; and Tonomoto, Yoshihiro, 5,036,363, Cl. 355-246.000.

Toray Silicon Company, Limited: *See*—
Ozaki, Masaru; and Ona, Isao, 5,036,123, Cl. 524-267.000.

Toray Silicone Company, Inc.: *See*—
Mine, Katsutoshi; Kogo, Akemi; Yamakawa, Kimio; and Nakayoshi, Kazumi, 5,036,024, Cl. 437-211.000.

Torii, Nozomu: *See*—
Fukumoto, Ryoichi; Hayakawa, Shigeru; Torii, Nozomu; and Okudaira, Souichiro, 5,035,454, Cl. 292-337.000.

Torocsik, Laszlo : *See*—
Simonyi, Sandor; Torocsik, Laszlo ; Toth, Istvan; and Valoczi, Gyorgy, 5,035,113, Cl. 60-390.000.

Toshiba Ceramics Co., Ltd.: *See*—
Sugino, Takao; Kawamura, Toshio; Asai, Masamichi; Yamada, Hiroshi; Mukoyama, Kenichi; Takahashi, Akira; and Hikima, Hiroshi, 5,035,919, Cl. 427-140.000.

Toshiba Kikai Kabushiki Kaisha: *See*—
Katsuki, Masahide; and Shoji, Tsuneo, 5,035,086, Cl. 51-49.000.

Toshiba Lighting & Technology Corporation: *See*—
Kasai, Norio, 5,036,167, Cl. 174-256.000.

Toshiba Lighting & Technology Group: *See*—
Shimizu, Keiichi, 5,036,254, Cl. 315-219.000.

Toshiba Machine Co., Ltd.: *See*—
Fujita, Shigeru; Saito, Hideo; Yamamoto, Katsuyuki; Endo, Satoshi; and Kamahora, Fumio, 5,035,598, Cl. 425-144.000.

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Simonyi, Sandor; Torocsik, Laszlo ; Toth, Istvan; and Valoczi, Gyorgy, 5,035,113, Cl. 60-390.000.

Towle, Ross A.: *See*—
Rau, Bantwal R.; and Towle, Ross A., 5,036,454, Cl. 364-200.000.

Towns, Robert C., to Keswick Lake Pty. Ltd. Gate fittings. 5,035,084, Cl. 49-381.000.

Toybox Corporation: *See*—
Suzuki, Toshio, 5,035,430, Cl. 273-153.00S.

Toyo Boseki Kabushiki Kaisha: *See*—
Taguchi, Hiroaki; Katsushima, Takeo; Ban, Masakazu; Takahashi, Mitsuru; Shinoda, Kiyotaka; and Watanabe, Akihiko, 5,036,086, Cl. 514-367.000.

Toyo Engineering Corporation: *See*—
Tanaka, Shoji; Yamauchi, Hisao; Yamada, Yukio; Ohnuki, Masayoshi; Morita, Etsuji; Toyoshima, Mitsunobu; Wada, Yasuo; Hinoshita, Hirotaka; Ikeda, Wataru; Aihara, Etsuji; Kobayashi, Tutomu; and Suguro, Kuniaki, 5,035,597, Cl. 425-135.000.

Toyo Ink Manufacturing Co., Ltd.: *See*—
Kanno, Nobumori; Ishii, Kunio; Takeda, Neiji; and Nihashi, Hiroyuki, 5,035,953, Cl. 428-484.000.

Toyo Seikan Kaisha, Ltd.: *See*—
Murayama, Kashiwa; and Utsunomiya, Nobu, 5,035,594, Cl. 425-116.000.

Toyoda Gosei Co., Ltd.: *See*—
Nozaki, Masahiro, 5,035,937, Cl. 428-122.000.
Sakane, Katsunobu, 5,036,169, Cl. 200-61.540.

Toyoda, Shuhei; Mase, Syunzo; Matsuura, Masami; and Kawaguchi, Shogo, to NGK Insulators, Ltd. Optical unit including a substrate and optical element supported on the substrate such that thermal

stresses are prevented from being exerted on the optical element. 5,035,495, Cl. 350-588.000.
Toyoshima, Mitsunobu: *See*—
Tanaka, Shoji; Yamauchi, Hisao; Yamada, Yukio; Ohnuki, Masayoshi; Morita, Etsuji; Toyoshima, Mitsunobu; Wada, Yasuo; Hinoshita, Hirotaka; Ikeda, Wataru; Aihara, Etsuji; Kobayashi, Tutomu; and Suguro, Kuniaki, 5,035,597, Cl. 425-135.000.
Toyoshima, Yoshiki; Okada, Mitsuyuki; Fujii, Takeshi; Yamaguchi, Kentaro; and Tsuji, Mitsuji, to Sumitomo Chemical Company, Limited. Modified polyolefin resin. 5,036,141, Cl. 525-286.000.
Toyota Jidosha Kabushiki Kaisha: *See*—
Katsuno, Toshiyasu; Iguchi, Satoshi; and Chujo, Yoshiki, 5,035,358, Cl. 239-403.000.
Mizukoshi, Masashi, 5,035,225, Cl. 123-493.000.
Suzuki, Makoto; and Tanaka, Hiroshi, 5,036,470, Cl. 364-431.060.
Yamada, Minoru; and Kobayashi, Nobuo, 5,035,359, Cl. 239-502.000.
TP Orthodontics, Inc.: *See*—
Greenfield, Raphael L., 5,035,614, Cl. 433-21.000.
Tran, Dung Q., to Gazelle Microcircuits, Inc. Low ripple bias voltage generator. 5,036,229, Cl. 307-497.000.
Tran, Mank H., to Westinghouse Electric Corp. Blading for reaction turbine blade row. 5,035,578, Cl. 416-223.00A.
Trikha, Sudhir K.: *See*—
Iyer, S. Raja; and Trikha, Sudhir K., 5,036,116, Cl. 523-145.000.
Trilach Development Inc.: *See*—
Hageman, Martin D., 5,035,678, Cl. 474-50.000.
Trine Products Corp.: *See*—
Herron, William L., 5,036,441, Cl. 362-95.000.
Trion Industries Inc.: *See*—
Nagel, Thomas O., 5,035,388, Cl. 248-220.400.
Triple R. Designs, Inc.: *See*—
Reich, Robert R.; and Olesen, Jan, 5,035,674, Cl. 452-169.000.
Tritt, Paul G.: *See*—
Weisend, Norbert A., Jr.; and Tritt, Paul G., 5,035,380, Cl. 244-134.00A.
Troadec, Bernard: *See*—
Granger, Claude; and Troadec, Bernard, 5,035,685, Cl. 493-416.000.
Tronchon, Paul: *See*—
Coudurier, Pierre; Boutte, Pierre; Romeuf, Patrick; Tronchon, Paul; and Auffranc, Michel, 5,035,623, Cl. 434-286.000.
Tropicana Products, Inc.: *See*—
Daniels, Thomas C.; Jeruzal, Patricia M.; and Bettle, Griscom, III, 5,035,323, Cl. 206-386.000.
Trouiller, Jean-Claude; and Gounot, Marie-Therese, to Schlumberger Technology Corporation. Method and apparatus for measuring the resistivity of earth formations using anti-parallel active and passive focussing electrodes. 5,036,283, Cl. 324-375.000.
Trovo, Federico. Device for squeezing tubes containing a paste. 5,035,347, Cl. 222-95.000.
Truchon, Alain: *See*—
Comte, Marie-Therese; Gueremy, Claude; Malleron, Jean-Luc; Mignani, Serge; Peyronel, Jean-Francois; and Truchon, Alain, 5,036,075, Cl. 514-293.000.
Truett, Brett B. Trim strip protector. 5,035,938, Cl. 428-122.000.
TRW Daut+Rietz GmbH & Co.: *See*—
Steinhardt, Helmut; and Bieringer, Anton, 5,035,661, Cl. 439-839.000.
TRW Inc.: *See*—
Prednis, Leonard J.; Proctor, Michael L.; and Sugarman, Alan D., 5,036,479, Cl. 364-580.000.
TRW Technar Inc.: *See*—
Russell, Richard J.; Hunt, Freddie E.; and Chung, Frank K., 5,036,304, Cl. 335-209.000.
TRW Vehicle Safety Systems Inc.: *See*—
Blackburn, Brian K.; Mazur, Joseph F.; and Gentry, Scott B., 5,036,467, Cl. 364-424.050.
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Neumann, Harald P. G., 5,035,551, Cl. 408-224.000.
Tsai, Meei-lin: *See*—
Tsai, Shiang-shiun; Tsai, Ming-jeng; and Tsai, Meei-lin, 5,035,635, Cl. 439-188.000.
Tsai, Ming-jeng: *See*—
Tsai, Shiang-shiun; Tsai, Ming-jeng; and Tsai, Meei-lin, 5,035,635, Cl. 439-188.000.
Tsai, Shiang-shiun; Tsai, Ming-jeng; and Tsai, Meei-lin. Revolving safety socket. 5,035,635, Cl. 439-188.000.
Tsao, Chyi, to ACER Incorporated. Shading correction system for use with an optical scanner. 5,036,186, Cl. 250-208.100.
Tseng, Wu-Yang; and Hauser, Ambrose A., to General Electric Company. Blade tip clearance control apparatus with shroud segment position adjustment by unison ring movement. 5,035,573, Cl. 415-173.200.
Tseung, Lawrence C. N. Guaranteed reliable broadcast network. 5,036,518, Cl. 371-32.000.
Tsuboi, Shinichi: *See*—
Shiokawa, Kozo; Tsuboi, Shinichi; Sasaki, Shoko; Moriya, Koichi; Hattori, Yumi; and Shibuya, Katsuhiko, 5,036,082, Cl. 514-338.000.
Tsubota, Makio: *See*—
Asayama, Yoshio; Tsubota, Makio; Okura, Yasunori; and Sato, Takayuki, 5,035,312, Cl. 192-85.00R.
Tsuboyama, Akira: *See*—
Kawagishi, Hideyuki; Iwamoto, Hirofumi; Tsuboyama, Akira; and Mihara, Tadashi, 5,035,491, Cl. 350-350.00S.
Tsuchiya, Eiichi: *See*—
Hosoya, Atsushi; and Tsuchiya, Eiichi, 5,036,411, Cl. 360-85.000.
Tsuda, Masao: *See*—
Matsuo, Takao; Odaka, Hiroyuki; Suzuki, Tsuyoshi; and Tsuda, Masao, 5,036,081, Cl. 514-336.000.
Tsuei, Henry T.: *See*—
Barrow, Jeffrey; Pratt, William J.; and Tsuei, Henry T., 5,036,322, Cl. 341-144.000.
Tsuji, Mitsuji: *See*—
Toyoshima, Yoshiki; Okada, Mitsuyuki; Fujii, Takeshi; Yamaguchi, Kentaro; and Tsuji, Mitsuji, 5,036,141, Cl. 525-286.000.
Tsujino, Toshikazu: *See*—
Sakata, Masakazu; Shibata, Kenichi; Takeuchi, Kousuke; Tanaka, Toshiharu; Okano, Hiroshi; Tsujino, Toshikazu; and Kuroki, Kazuhiko, 5,036,199, Cl. 250-351.000.
Tsukada, Masamichi; and Tobe, Hayato, to Hitachi, Ltd. Atomic absorption spectroscopy photometer. 5,035,505, Cl. 356-319.000.
Tsukamoto, Yoshitsugu: *See*—
Ozeki, Kohji; Tsukamoto, Yoshitsugu; Yaginuma, Hideya; and Sato, Makoto, 5,036,052, Cl. 514-19.000.
Tsukaya, Takashi: *See*—
Kubokawa, Hiroaki; Tsukaya, Takashi; Ueda, Yasuhiro; Ohshima, Yutaka; Nakamura, Takeaki; Hibino, Hiroki; Takayama, Shuichi; and Hagino, Tadao, 5,035,231, Cl. 128-6.000.
Tsukuda, Takeshi: *See*—
Nishiyama, Koji; Yamazaki, Masayuki; Tsukuda, Takeshi; and Arai, Youtaro, 5,035,744, Cl. 106-1.230.
Tsumura, Toshihiro: *See*—
Date, Yozo; and Tsumura, Toshihiro, 5,035,058, Cl. 30-387.000.
Tsunekawa, Tokuichi; Nagano, Akihiko; and Konishi, Kazuki, to Canon Kabushiki Kaisha. Visual line detecting device and camera having the same. 5,036,347, Cl. 354-400.000.
Tsuyama, Seishi: *See*—
Sakiyama, Tetsuo; Tsuyama, Seishi; and Minakawa, Kuninori, 5,035,754, Cl. 148-159.000.
Tucci, Jerry: *See*—
Nirenberg, Morris; and Tucci, Jerry, 5,035,192, Cl. 112-110.000.
Tucker, Francis C. Paintbrush holder. 5,035,386, Cl. 248-110.000.
Tuckey, Charles H., to Walbro Corporation. Rotary fuel pump with pulse modulation. 5,035,588, Cl. 417-540.000.
Tufano, Thomas P.: *See*—
Houle, William A.; and Tufano, Thomas P., 5,035,992, Cl. 430-569.000.
Tuggle, Lloyd H.: *See*—
Sadler, Jeffery G.; Tuggle, Lloyd H.; and Collins, Imack L., 5,035,586, Cl. 417-363.000.
Tunesi, Simonetta: *See*—
Anderson, Marc A.; Tunesi, Simonetta; and Xu, Qunyin, 5,035,784, Cl. 204-158.140.
Tveit, Gary L.; and Nageldinger, Edward L., to Eastman Kodak Company. Simple tooling exchange. 5,035,457, Cl. 294-86.004.
Tylkowski, Larry B. Tip-up pole and/or ice fishing eyelets. 5,035,074, Cl. 43-24.000.
UBE Industries, Ltd.: *See*—
Ueno, Kouhei; and Tanaka, Kazuyoshi, 5,036,127, Cl. 524-423.000.
Uchida, Akio: *See*—
Yoshimura, Toru; Uchida, Akio; Ito, Takaaki; and Saruwatari, Nobuya, 5,036,420, Cl. 361-118.000.
Uchida, Akito; and Uehara, Daiji, to Kabushiki Kaisha Nagano Keiki Seisakusho. Solenoid pump driving circuit. 5,036,422, Cl. 361-159.000.
Uchinami, Masanobu; and Takahashi, Toshihisa, to Mitsubishi Denki K.K. Fuel controller for an internal combustion engine. 5,035,220, Cl. 123-436.000.
Uchiyama, Kenji: *See*—
Yoshida, Susumu; Onishi, Sei; and Uchiyama, Kenji, 5,036,407, Cl. 360-25.000.
Ueda Engineering Kabushiki Kaisha: *See*—
Ueda, Hiroshi, 5,035,555, Cl. 409-218.000.
Ueda, Hiroshi, to Ueda Engineering Kabushiki Kaisha. Device for setting workpiece to position. 5,035,555, Cl. 409-218.000.
Ueda, Hiroshi: *See*—
Inoue, Manabu; Taniguchi, Nobuyuki; Hata, Yoshiaki; Hoda, Takeo; Kudo, Yoshinobu; and Ueda, Hiroshi, 5,036,344, Cl. 354-106.000.
Ueda, Kazutoshi: *See*—
Sakurai, Kenichi; and Ueda, Kazutoshi, 5,035,207, Cl. 123-41.100.
Ueda, Shinjiro: *See*—
Sonobe, Tadasi; Katane, Mamoru; Ikeguchi, Takashi; Matsumoto, Manabu; Ueda, Shinjiro; Kobari, Toshiaki; Takahashi, Takao; Hayasaka, Toa; and Kitayama, Toyoki, 5,036,290, Cl. 328-235.000.
Ueda, Tomoaki, to Daikin Industries, Ltd. Image memory data processing control apparatus. 5,036,475, Cl. 364-518.000.
Ueda, Yasuhiro: *See*—
Kubokawa, Hiroaki; Tsukaya, Takashi; Ueda, Yasuhiro; Ohshima, Yutaka; Nakamura, Takeaki; Hibino, Hiroki; Takayama, Shuichi; and Hagino, Tadao, 5,035,231, Cl. 128-6.000.
Ueda, Yoshiaki: *See*—
Shiratori, Naoki; Ueda, Yoshiaki; and Mitobe, Isami, 5,035,449, Cl. 292-48.000.
Uehara, Daiji: *See*—
Uchida, Akito; and Uehara, Daiji, 5,036,422, Cl. 361-159.000.
Uejima, Takamasa: *See*—
Shiraishi, Kenichi; Uejima, Takamasa; and Katayama, Hironobu, 5,036,412, Cl. 360-85.000.

Ueki, Yasuhiro, to Victor Company of Japan, Ltd. Brushless motor with no rotor-position sensor. 5,036,264, Cl. 318-254.000.
Uematsu, Yutaka: *See—*
Hatakoshi, Genichi; Itaya, Kazuhiko; Naritsuka, Shigeya; Ishikawa, Masayuki; Okuda, Hajime; Shiozawa, Hideo; Watanabe, Yukio; Ohba, Yasuo; Kokubun, Yoshihiro; and Uematsu, Yutaka, 5,036,521, Cl. 372-46.000.
Uemura, Katsuoki; Ando, Masaru; Yamauchi, Jun-Ichi; and Akutsu, Yoshinori, to Chisso Corporation. Process for producing molded article using a releasing agent. 5,035,849, Cl. 264-255.000.
Uemura, Tadashi; Minagawa, Tsutomu; and Saito, Sadahiro, to Showa Denko K.K.; and Shunan Denko K.K. Reduced chromium-ore bearing powder and method for producing the same. 5,035,742, Cl. 75-623.000.
Ueno, Eiji, to Pioneer Electronic Corporation. Noise suppression apparatus for FM receiver. 5,036,543, Cl. 381-94.000.
Ueno, Kouhei; and Tanaka, Kazuyoshi, to UBE Industries, Ltd. Fiber-reinforced thermoplastic resin composition. 5,036,127, Cl. 524-423.000.
Uesugi, Yuji: *See—*
Nishikawa, Yukio; and Uesugi, Yuji, 5,035,202, Cl. 118-727.000.
Uhde, Dietmar: *See—*
Kaaden, Jurgen; and Uhde, Dietmar, 5,036,409, Cl. 360-51.000.
Ulman, Katherine L.: *See—*
Lee, Chi-Long; and Ulman, Katherine L., 5,035,894, Cl. 424-448.000.
Ulstein Propeller A/S: *See—*
Royset, Norvald, 5,035,662, Cl. 440-50.000.
Um, Gregory: *See—*
Lee, Yeon H.; and Um, Gregory, 5,035,475, Cl. 350-6.500.
Umeda, Shigeru, to Obara Corporation. Welding gun having equalizing function. 5,036,175, Cl. 219-89.000.
Umehara, Masakazu: *See—*
Fukusaki, Hiroaki; Umehara, Masakazu; and Gatayama, Hiroyuki, 5,035,315, Cl. 198-419.200.
Umemoto, Donald K.: *See—*
Holm-Kennedy, James W.; and Umemoto, Donald K., 5,036,286, Cl. 324-661.000.
Umemura, Masahiro: *See—*
Koyama, Noboru; Nakano, Yasushi; Yasufuku, Yoshitaka; Kawahara, Setsuko; Namiki, Takemasa; Kawabe, Shigetoshi; and Umemura, Masahiro, 5,035,856, Cl. 428-328.000.
Umezawa, Kazuhiko, to NEC Corporation. Cooling system for IC package. 5,036,384, Cl. 357-82.000.
Umezawa, Toshimitsu, to Kabushiki Kaisha Toshiba. Color television receiver. 5,036,387, Cl. 358-29.000.
Ungar, Alexander. Beehive. 5,035,668, Cl. 449-6.000.
UNIFI Communications Corporation: *See—*
Gechter, Jerry; Fried, Jeffrey A.; and Pokress, Robert L., 5,036,535, Cl. 379-210.000.
Unilever Patent Holdings BV: *See—*
Aldcroft, Derek; Newton, John R.; and Stanier, Peter W., 5,035,879, Cl. 424-49.000.
Union Oil Company of California: *See—*
Occelli, Mario L., 5,035,868, Cl. 423-326.000.
Shen, Jian-Chyun, 5,035,813, Cl. 252-8.551.
West, Martin; and Abdo, Suheil F., 5,036,033, Cl. 502-64.000.
Young, Donald C., 5,035,737, Cl. 71-83.000.
Unique-Quality Products, Inc.: *See—*
Norsworthy, John A., 5,035,630, Cl. 439-92.000.
United States of America
Army: *See—*
Hansen, Charles L., 5,035,472, Cl. 350-1.100.
Plichta, Edward J.; and Behl, Wishvander; K., 5,035,963, Cl. 429-103.000.
Energy: *See—*
Dunn, Paul S.; Sheinberg, Haskell; Hogan, Billy M.; Lewis, Homer D.; and Dickinson, James M., 5,035,854, Cl. 420-3.000.
Stout, Norman D.; and Newkirk, Herbert W., 5,035,769, Cl. 156-639.000.
Interior: *See—*
Scott, Douglas F., 5,035,060, Cl. 33-228.000.
Yavorsky, Paul M., 5,035,722, Cl. 44-605.000.
Navy: *See—*
Bowman, Steven R.; and Rabinovich, William S., 5,036,520, Cl. 372-41.000.
Cain, R. Neal; and Corda, Albert J., 5,036,323, Cl. 342-6.000.
Covino, Josephine, 5,035,756, Cl. 149-37.000.
Higa, Kelvin T.; and Harris, Daniel C., 5,035,874, Cl. 423-509.000.
Jacks, Donald J.; Panlaqui, Clayton E.; Boss, Raymond E.; and Gaunt, Edwin, 5,035,181, Cl. 102-481.000.
Marshall, Albert H.; Wolff, Ronald S.; McCormack, Robert T.; and Purvis, Edward J., 5,035,622, Cl. 434-23.000.
McGarry, John M.; Dilts, Howard S.; and Langenborg, Nils O., 5,035,112, Cl. 60-39.823.
Purcell, Nick L.; Schmidt, Joseph A.; and O'Malley, John A., 5,035,180, Cl. 102-481.000.
Purcell, Nick L.; Schmidt, Joseph A.; and O'Malley, John A., 5,035,182, Cl. 102-481.000.
Schwartz, Carey, 5,036,371, Cl. 357-16.000.
Shaw, Clifford O., 5,036,285, Cl. 324-546.000.
U.S. Philips Corporation: *See—*
Bierhoff, Martinus P. M., 5,036,506, Cl. 369-44.280.
den Haan, Petrus A. M.; and Hopmans, Franciscus P. M., 5,036,459, Cl. 364-200.000.
Faes, Franciscus C. M.; Van Gastel, Josephus M. M.; Van De Ven, Johannes T. A.; and Verberne, Petrus A. C., 5,035,322, Cl. 206-328.000.
Hales, Jeffrey E., 5,036,302, Cl. 333-202.000.
Hoekstra, Albert, 5,035,053, Cl. 30-43.600.
Hoffmann, Friedrich; and Wings, Leo, 5,036,439, Cl. 362-61.000.
Janssen, Johannes J. M., 5,036,392, Cl. 358-138.000.
Kunze, Norbert, 5,036,414, Cl. 360-96.500.
Renders, Martinus A.; and Sastra, Budiman, 5,036,410, Cl. 360-72.200.
Salembier, Philippe; and Hayet, Pascal, 5,036,388, Cl. 358-34.000.
Schemmel, Hans-Robert, 5,036,288, Cl. 328-15.000.
Sluyterman, Albertus A. S., 5,036,250, Cl. 315-8.000.
United States Surgical Corporation: *See—*
Korthoff, Herbert W., 5,035,707, Cl. 606-224.000.
United Technologies Corporation: *See—*
Byrnes, Francis E.; and Schmaling, David N., 5,035,576, Cl. 416-134.00R.
Grondin, David H.; and Schade, Irene M., 5,035,811, Cl. 210-806.000.
Halpert, Pinke; and Platt, Royce, 5,035,725, Cl. 51-293.000.
Universal Instruments Corporation: *See—*
Coates, Carl T.; and Boucher, Dennis G., 5,035,316, Cl. 198-459.000.
University of Arkansas: *See—*
Hermann, Allen M.; and Sheng, Zhengzhi, 5,036,044, Cl. 505-1.000.
University of California, The Regents of the: *See—*
Cohen, Yoram, 5,035,803, Cl. 210-656.000.
Li, Jianhua, 5,036,281, Cl. 324-309.000.
University of Florida: *See—*
Abela, George S.; and Friedl, Stephan E., 5,036,463, Cl. 364-413.130.
University of Kansas: *See—*
Anderson, H. Clarke; and Sugamoto, Kazuomi, 5,035,901, Cl. 424-573.000.
University of Kentucky Research Foundation: *See—*
Floyd, Robert A.; and Carney, John M., 5,036,097, Cl. 514-400.000.
University of Massachusetts: *See—*
Knapp, Jeffrey P., 5,035,776, Cl. 203-19.000.
University of Melbourne, The: *See—*
Martin, Christopher J., 5,036,057, Cl. 514-54.000.
University of Rochester: *See—*
Borch, Richard F.; and Schmalbach, Therese K., 5,035,878, Cl. 424-10.000.
University of Toronto Innovations Foundation, The: *See—*
Green, Christopher J.; and Wallace, James S., 5,035,360, Cl. 239-585.000.
University of Virginia Alumni Patents Foundation, The: *See—*
Thorner, Michael O., 5,036,045, Cl. 514-12.000.
Unsold, Eberhard: *See—*
Kratzer, Michael; and Unsold, Eberhard, 5,035,693, Cl. 606-12.000.
Unterlander, Rick; and Fok, Tai C., to Husky Injection Molding Systems Ltd. Apparatus for aligning a parison with a blow mold. 5,035,603, Cl. 425-522.000.
UOP: *See—*
Foutsitzis, Arthur A.; Padrta, Frank G.; and Russ, Michael B., 5,035,792, Cl. 208-138.000.
Urabe, Shigeharu: *See—*
Ichikawa, Yasunori; Ohnishi, Hiroshi; Urabe, Shigeharu; Kojima, Akira; and Katoh, Akira, 5,035,991, Cl. 430-569.000.
Urban, Manfred: *See—*
Dietz, Erwin; and Urban, Manfred, 5,035,747, Cl. 106-495.000.
Urbinati, Francesco: *See—*
Barillari, Piero; DeSanti, Pierluigi; Galderesi, Mario; Marchi, Carlo A.; Natili, Franco; Rossiello, Vincenzo; Settembre, Donato; and Urbinati, Francesco, 5,036,314, Cl. 340-717.000.
Uredat, Claus; and Ritter, Wolfgang, to Roder GmbH Sitzmobelwerke. Table having a connection device. 5,035,186, Cl. 108-159.000.
Uronen, Lasse J.; and Saarela, Matti J., to Nokia Mobile Phones Ltd. Plastic shell structure for radio telephone. 5,036,432, Cl. 361-422.000.
Usui, Toshinao: *See—*
Kurono, Masayasu; Usui, Toshinao; Miura, Kenji; Kondo, Yasuaki; and Sawai, Kiichi, 5,036,080, Cl. 514-333.000.
Utsunomiya, Nobu: *See—*
Murayama, Kashiwa; and Utsunomiya, Nobu, 5,035,594, Cl. 425-116.000.
Utsunomiya, Takeshi; Hoshino, Kazuo; and Hirotsu, Sadao, to Nisshin Steel Company, Ltd. Martensitic precipitation-hardenable stainless steel. 5,035,855, Cl. 420-61.000.
Uwabata, Hideyo: *See—*
Yasumoto, Yoshio; Kageyama, Sadashi; Inoue, Syuji; Abe, Yoshio; and Uwabata, Hideyo, 5,036,386, Cl. 358-12.000.
V-Tech, Inc.: *See—*
Foldenauer, Kenneth J., 5,035,494, Cl. 350-536.000.
Valette, Michel, to S.N.R. Roulements. Deformable self-adjusting ball bearing cage. 5,035,520, Cl. 384-526.000.
Valmet Paper Machinery Inc.: *See—*
Mannio, Aaron, 5,035,196, Cl. 118-126.000.
Valoczi, Gyorgy: *See—*
Simonyi, Sandor; Torocsik, Laszlo ; Toth, Istvan; and Valoczi, Gyorgy, 5,035,113, Cl. 60-390.000.
Van Dale, Inc.: *See—*
Buschbom, Floyd E., 5,035,317, Cl. 198-642.000.
van Alst, Gerardus M.: *See—*
ten Berge, Eduardus F. A.; and van Alst, Gerardus M., 5,035,482, Cl. 350-96.200.

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Spruill, David B.; Banyasz, Joseph L.; and Van Auken, Thomas V., 5,035,731, Cl. 55-387.000.

Van Broeck, Didier; and Mosse, Madeleine, to Sanofi. 1-(benzyl-piperidino)propan-2-ol derivatives, their preparation, their use as antimicrobial agents and the products in which they are present. 5,036,077, Cl. 514-317.000.

Van Cappel, Dominique, to Thomson-CSF. Method for determining the motion of a target in underwater acoustics. 5,036,498, Cl. 367-125.000.

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van der Walt, Nicolaas T., to Crucible Societe Anonyme. Method of and apparatus for detecting cross sectional area variations in an elongate object by the non-inductive measurement of radial flux variations. 5,036,277, Cl. 324-235.000.

Van De Ven, Johannes T. A.: *See—*
Faes, Franciscus C. M.; Van Gastel, Josephus M. M.; Van De Ven, Johannes T. A.; and Verberne, Petrus A. C., 5,035,322, Cl. 206-328.000.

Van Gastel, Josephus M. M.: *See—*
Faes, Franciscus C. M.; Van Gastel, Josephus M. M.; Van De Ven, Johannes T. A.; and Verberne, Petrus A. C., 5,035,322, Cl. 206-328.000.

Van-Santbrink, Ronald; Collier, John C.; and Lee, David, to ITT Industries Limited. Terminating insulated conductors. 5,035,641, Cl. 439-329.000.

Vaqueiro, Maria C.: *See—*
Lomelin, Juan M.; and Vaqueiro, Maria C., 5,035,909, Cl. 426-473.000.

Vara, Fulvio J.: *See—*
Dougherty, James A.; Plotkin, Jeffrey S.; Vara, Fulvio J.; and Narayanan, Kolazi S., 5,036,112, Cl. 522-31.000.

Vasiliev, Andrei V.: *See—*
Arabei, Boris G.; Kostyrev, Sergei B.; Mints, Alexandr S.; Pronin, Lev A.; Ryzhonkov, Dmitry I.; Sopochkin, Sergei A.; Stepnov, Sergei A.; Esikman, Vladimir L.; Vasiliev, Andrei V.; and Kolgin, ALexandr P., 5,036,170, Cl. 219-10.410.

Vaught, Reid W., to Smith & Loveless, Inc. Sewage pump priming system. 5,035,583, Cl. 417-200.000.

VDO Adolf Schindling AG: *See—*
Feldinger, Martin, 5,035,222, Cl. 123-452.000.
Pfalzgraf, Manfred; Hickmann, Gerd; and Mausner, Eberhard, 5,035,213, Cl. 123-336.000.

Vegyimuveket Epito es Szerelo Vallalat: *See—*
Kalman, Pinter, 5,035,346, Cl. 222-68.000.

Velraeds, Gijsbertus: *See—*
Duijve, Johan A.; and Velraeds, Gijsbertus, 5,036,359, Cl. 355-203.000.

Vemula, Rao: *See—*
Oken, Stanley; Vemula, Rao; and Lee, Eugene, 5,036,538, Cl. 381-43.000.

Venkatasubramanian, Krishnamurthy: *See—*
Audhya, Tapan; Venkatasubramanian, Krishnamurthy; and Goldstein, Gideon, 5,036,050, Cl. 514-17.000.

Verberne, Petrus A. C.: *See—*
Faes, Franciscus C. M.; Van Gastel, Josephus M. M.; Van De Ven, Johannes T. A.; and Verberne, Petrus A. C., 5,035,322, Cl. 206-328.000.

Vergano, Stefano: *See—*
Sartorio, Franco; and Vergano, Stefano, 5,035,566, Cl. 414-729.000.

VG Instruments Group Limited: *See—*
Batey, Johnathan H.; and Richards, Donald S., 5,036,195, Cl. 250-288.000.

Vickers, Incorporated: *See—*
Blatter, Albert; and Davis, Robert E., 5,035,254, Cl. 137-85.000.

Victor Company of Japan, Ltd.: *See—*
Hosoya, Atsushi; and Tsuchiya, Eiichi, 5,036,411, Cl. 360-85.000.
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, 5,036,270, Cl. 324-96.000.
Ueki, Yasuhiro, 5,036,264, Cl. 318-254.000.

Vierto, Raine: *See—*
Makela, Toivo, 5,035,135, Cl. 72-422.000.

Villwock, Thomas: *See—*
Kaneda, Takashi; and Villwock, Thomas, 5,036,429, Cl. 361-392.000.

Virtue, Peter J., to Sony Corporation. Binary adding apparatus. 5,036,483, Cl. 364-786.000.

Vitak, Josef: *See—*
Beran, Jaroslav; Pavlu, Milos; Prasil, Vladimir; Holy, Zdenek; Pesek, Frantisek; Vitamvas, Zdenek; and Vitak, Josef, 5,035,369, Cl. 242-18.0DD.

Vitamvas, Zdenek: *See—*
Beran, Jaroslav; Pavlu, Milos; Prasil, Vladimir; Holy, Zdenek; Pesek, Frantisek; Vitamvas, Zdenek; and Vitak, Josef, 5,035,369, Cl. 242-18.0DD.

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VMC Industries, Inc.: *See—*
Meyersburg, Richard W., 5,035,339, Cl. 215-1.00C.

Voege, Herbert: *See—*
Andrews, Peter; Dorn, Hubert; and Voege, Herbert, 5,036,069, Cl. 514-249.000.

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Hermanns, Ferdinand-Josef, 5,035,370, Cl. 242-18.100.
Raasch, Hans, 5,035,571, Cl. 414-789.500.

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Geiger, Hartmut, 5,035,255, Cl. 137-102.000.

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Gottling, Helmut; Moller, Rudolf; Muller, Peter; and Scharnowski, Gerhard, 5,035,171, Cl. 92-137.000.

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Okada, Kazuhiro, 5,035,148, Cl. 73-862.040.

Wada, Hiroshi: *See—*
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Tanaka, Shoji; Yamauchi, Hisao; Yamada, Yukio; Ohnuki, Masayoshi; Morita, Etsuji; Toyoshima, Mitsunobu; Wada, Yasuo; Hinoshita, Hirotaka; Ikeda, Wataru; Aihara, Etsuji; Kobayashi, Tutomu; and Suguro, Kuniaki, 5,035,597, Cl. 425-135.000.

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Igarashi, Toshio; Wakatsuki, Akira; Sudo, Kenichi; and Shida, Yuu, 5,036,124, Cl. 524-298.000.

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Adachi, Keiichi; Ohno, Shigeru; and Waki, Kokichi, 5,035,985, Cl. 430-432.000.

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Tuckey, Charles H., 5,035,588, Cl. 417-540.000.

Walczak, Thomas J.: *See—*
Metroka, Michael P.; Walczak, Thomas J.; and Kroiopp, Robert K., 5,036,532, Cl. 379-58.000.

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Robbins, Ronald B.; Sakowski, John D.; and Walden, William R., 5,035,018, Cl. 8-150.000.

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Medemblik, John J.; and Devries, William, 5,035,543, Cl. 406-39.000.

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Hanon, David O.; and Walker, Ricky R., 5,036,536, Cl. 379-387.000.

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Filion, Joseph L.; Sundquist, Douglas F.; Schmitt, Paul F.; Evanitsky, Eugene S.; and Warddrip, Riley L., 5,036,361, Cl. 355-209.000.

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Apfel, Marilyn A.; Ghebre-Sellassie, Isaac; and Nesbitt, Russell U., 5,035,896, Cl. 424-456.000.
Himmelsbach, Richard; Hodges, John C.; Kaltenbronn, James S.; Patt, William C.; Repine, Joseph T.; and Sircar, Ila, 5,036,053, Cl. 514-19.000.
Hussein, Mamoun M.; Barcelon, Shirley A.; and Lynch, Donald M., 5,035,882, Cl. 424-58.000.
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Song, Suk-Zu; Mehta, Surendra C.; Murthy, Kuchi S.; Nesbitt, Russell U.; and Fawzi, Mahdi B., 5,035,884, Cl. 424-78.000.
Suto, Mark J., 5,036,089, Cl. 514-376.000.
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Breads, Peter R.; Abbatte, Gerard P.; and Warunek, Stephen P., 5,035,613, Cl. 433-6.000.

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Blake, Larry D., 5,035,764, Cl. 156-327.000.

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Nakajima, Tsunetaka; Okamoto, Tadao; Watanabe, Masahiro; and Yokoyama, Kazumasa, 5,036,072, Cl. 514-274.000.

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Yamasaki, Kazuyuki; Yamamoto, Kimio; Watanabe, Masanobu; Kan, Kojiro; and Nakayama, Yoshio, 5,035,802, Cl. 210-440.000.

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Kneen, Geoffrey; Jackson, William P.; Islip, Peter J.; and Wates, Peter J., 5,036,157, Cl. 562-623.000.

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Watkins, Robert W., to Schering Corporation. Angiotensin II receptor blockers as antiglaucoma agents. 5,036,048, Cl. 514-16.000.

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Lissaman, Peter B. S.; Morgan, W. R.; Cowley, Martyn B.; Sink, Charles J.; and Watson, William D., 5,035,382, Cl. 244-190.000.

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Weber, Jeffrey A.: *See*—
Mathews, Marty K.; and Weber, Jeffrey A., 5,035,466, Cl. 297-337.000.

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Eckhardt, Claude; Hefti, Heinz; Meyer, Hans R.; and Weber, Kurt, 5,035,825, Cl. 252-95.000.

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Aignesberger, Alois; Weichmann, Josef; Plank, Johann; and Bichler, Manfred, 5,035,812, Cl. 252-8.510.

Weihrauch, Georg: *See*—
Hollenberg, Detlef; Schneider, Hans; and Weihrauch, Georg, 5,035,251, Cl. 132-112.000.

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Lutze, Theodor; and Weisshaupt, Dieter, 5,035,232, Cl. 128-20.000.

Welch, Alan B.; Skinner, Raymond C. D.; and Goetz, Wendelin A., to Ortech Corporation. Dual fuel natural gas/diesel 2-stroke engine. 5,035,206, Cl. 123-27.0GE.

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Neubecker, Karlheinz; Rohde, Cordt; and Welzig, Gerhard, 5,035,611, Cl. 432-176.000.

Wendell, Dennis L., to National Semiconductor Corporation. Single ended MOS to ECL output buffer. 5,036,224, Cl. 307-475.000.

Weng, Lih-Jyh: *See*—
Leis, Michael D.; Leshay, Bruce; Muchnik, Michael; Rege, Satish; Riggle, Charles M.; and Weng, Lih-Jyh, 5,036,408, Cl. 360-48.000.

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Werthmann, Paul E. Support clip and method of use. 5,035,384, Cl. 248-74.200.

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Westell, William E., to Honeywell Regelsysteme GmbH. Film writer and viewer system. 5,036,398, Cl. 358-214.000.

Wester, Karl H.: *See*—
Burnett, Carl M.; and Wester, Karl H., 5,035,627, Cl. 439-64.000.

Westerberg, Eugene R.; and Beaver, Robert I., II, to Quadlux, Inc. Visible light and infra-red cooking apparatus. 5,036,179, Cl. 219-411.000.

Westfahl, Steven L.: *See*—
Williams, Wayne T.; and Westfahl, Steven L., 5,035,168, Cl. 84-435.000.
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Roselli, Leonard, 5,036,468, Cl. 364-426.050.
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MacDougall, David B., 5,036,478, Cl. 364-562.000.
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Abodishish, Hani A. M., 5,035,404, Cl. 266-148.000.
Dederer, Jeffery T.; and Hackworth, Donald T., 5,036,305, Cl. 335-216.000.
Jensen, Russell R., 5,035,962, Cl. 429-40.000.
Land, John T.; Hopkins, Ronald J.; and Ford, Daniel E., 5,035,852, Cl. 376-353.000.
Persing, Brian J., 5,035,626, Cl. 434-408.000.
Tran, Mank H., 5,035,578, Cl. 416-223.00A.
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Hagen, Helmut; Pfister, Juergen; Eichenauer, Ulrich; Wuerzer, Bruno; Helbig, Wilfried; and Westphalen, Karl-Otto, 5,035,736, Cl. 71-98.000.
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Gupta, Pramod K.; and Pullman, Gerald S., 5,036,007, Cl. 435-240.450.
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Latimer, Paul J.; and Whaley, Hubert L., 5,035,143, Cl. 73-598.000.
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Gardner, David M.; and Wheaton, Gregory A., 5,035,777, Cl. 204-79.000.
Wheeler, Dale K., to Black & Decker Inc. Method for producing a stamped substrate. 5,035,049, Cl. 29-845.000.
Whirlpool International B.V.: *See*—
Kokkeler, Franciscus; Idebro, Mats; Cigarini, Enzo; and Fioroli, Mario, 5,036,172, Cl. 219-10.55M.
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Sadler, Jeffery G.; Tuggle, Lloyd H.; and Collins, Imack L., 5,035,586, Cl. 417-363.000.
White, Paul. Hinge bar connector assembly to connect ramps to a flat bed trailer. 5,035,565, Cl. 414-537.000.
White, Robert T.; Liebig, Thomas J.; and Switzer, Jeffrey K., to Rohr Industries, Inc. Method and apparatus for hot die draw forming metal sheets. 5,035,133, Cl. 72-350.000.
White, William C.: *See*—
Blank, Lynne M. B.; Boyce, Thomas D.; and White, William C., 5,035,892, Cl. 424-443.000.
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Fischer, Ulf; Schneider, Fernand; and Widmer, Ulrich, 5,036,066, Cl. 514-211.000.
Wiechering, Christian: *See*—
Hupka, Rolf; and Wiechering, Christian, 5,036,403, Cl. 358-299.000.
Wiegand, James H.: *See*—
Hertel, Karl R.; and Wiegand, James H., 5,035,681, Cl. 474-152.000.
Wieland, Rudolf: *See*—
Grau, Gerhard; and Wieland, Rudolf, 5,035,027, Cl. 19-258.000.
Wierenga, Peter J. Soil solution sampler. 5,035,149, Cl. 73-863.230.
Wieting, David W.; Nguyen, Than; Stobie, Robert; Lam, Hung L.; and Kafesjian, Ralph, to Baxter International Inc. Mechanical heart valve with compliant sewing ring. 5,035,709, Cl. 623-2.000.
Wiggins Teape Group Limited, The: *See*—
North, Brian, 5,035,844, Cl. 264-4.330.
Wildlife Research Center, Inc.: *See*—
Burgeson, John R.; and Burgeson, John C., 5,035,435, Cl. 273-418.000.
Wildy, Thomas E.: *See*—
Bergquist, Dwight H.; Lorimor, Gary D.; and Wildy, Thomas E., 5,035,067, Cl. 34-231.000.
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von Gentzkow, Wolfgang; Huber, Jurgen; Rogler, Wolfgang; and Wilhelm, Dieter, 5,036,135, Cl. 524-786.000.
Wille, Franklin. Valve shut-off flag. 5,035,195, Cl. 116-277.000.
Willert, Hans-Georg; Koch, Rudolf; and Burgi, Maxa, to Sulzer Brothers Limited. Reinforcement for a bone cement bed. 5,035,714, Cl. 623-16.000.
Williams, Eric A., to Desco Industries, Inc. Adjustable metal antistatic bracelet. 5,036,423, Cl. 361-212.000.
Williams, Stuart K.: *See*—
Alchas, Paul G.; Augello, Frank A.; Brooks, Christopher J.; Cutshall, Tony A.; DiPisa, Joseph A., Jr.; Williams, Stuart K.; Gabel, Jonathan B.; Mulhauser, Paul J.; Prais, Wes; Jarrell, Bruce E.; and Rose, Deborah G., 5,035,708, Cl. 623-1.000.
Williams, Wayne T.; and Westfahl, Steven L. Balance pin assembly for a piano key. 5,035,168, Cl. 84-435.000.
Willmann, Hartmut; Dittmann, Ludwig; Heinz, Richard; and Lutzeler, Jorn, to BTS Broadcast Television Systems GmbH. Magnetic tape recorder with shielding device for contact-free signal transfer between components moved relative to one another. 5,036,418, Cl. 360-108.000.
Wilmotte, Stephan H.: *See*—
Noville, Jean-Francois L.; and Wilmotte, Stephan H., 5,035,403, Cl. 266-114.000.
Wilson, David P.: *See*—
Magid, Hillel; Shankland, Ian R.; Wilson, David P.; Cook, Kane D.; and Lund, Earl A. E., 5,035,831, Cl. 252-171.000.
Wilson, Douglas W., to Hughes Aircraft Company. Air gap matching proximity sensor for magnetic bearings. 5,036,236, Cl. 310-90.500.
Wilson, Geoffrey; and Evans, Gareth A., to Sarclad International Limited. Electrical discharge apparatus with a dielectric fluid assembly. 5,036,173, Cl. 219-69.110.
Wilson, Kenneth T.: *See*—
Downes, Robert W.; Smith, Wilson E.; Suciu, Ronald E.; and Wilson, Kenneth T., 5,036,514, Cl. 371-51.000.
Wilson, Richard: *See*—
Burns, Johnny L.; and Wilson, Richard, 5,035,738, Cl. 71-88.000.
Wimberger, Richard J., to W. R. Grace & Co.-Conn. Ultraviolet air floatation bar. 5,035,066, Cl. 34-156.000.
Wind Pro Corporation, The: *See*—
Biasi, Franco A., 5,035,068, Cl. 36-3.00R.
Wingo, James C., Jr.; and Kraemer, Nelson, to Riddell, Inc. Protective helmet and liner. 5,035,009, Cl. 2-414.000.
Wings, Leo: *See*—
Hoffmann, Friedrich; and Wings, Leo, 5,036,439, Cl. 362-61.000.
Winiewski, Gerald. Rotary toothbrush. 5,035,020, Cl. 15-23.000.
Winton, Robert A.; and Christie, Eugene F., to Rexham Corporation. Aluminum-fluoropolymer laminate. 5,035,940, Cl. 428-174.000.
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Anderson, Marc A.; Tunesi, Simonetta; and Xu, Qunyin, 5,035,784, Cl. 204-158.140.
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Wise, Robin A., Jr.: *See*—
Carroll, Robert G.; and Wise, Robin A., Jr., 5,036,201, Cl. 250-363.100.
Witkin, Roy T., to Jacobs, Albert L., a part interest. Composition and method for treating human disorders susceptible to antimicrobial treatment. 5,035,883, Cl. 424-78.000.
Woelfel, Julian B., to Girrbach Dental GmbH. Device for separating the premolars and molars. 5,035,616, Cl. 433-72.000.
Wohld, Dietrich: *See*—
Weihrich, Georg; Wohld, Dietrich; Niemann, Martin; and Jungkunz, Clemens, 5,036,265, Cl. 318-618.000.
Wolf, Edward D.: *See*—
Sanford, John C.; Wolf, Edward D.; and Allen, Nelson K., 5,036,006, Cl. 435-172.100.
Wolff, Ronald S.: *See*—
Marshall, Albert H.; Wolff, Ronald S.; McCormack, Robert T.; and Purvis, Edward J., 5,035,622, Cl. 434-23.000.
Wolfram, James H.; and Rogers, Robert D. Biodegradation of liquid scintillation cocktails. 5,036,012, Cl. 435-262.000.
Woller, Josef: *See*—
Hass, Jurgen; and Woller, Josef, 5,035,657, Cl. 439-748.000.
Wondrack, Lillian M.: *See*—
Wood, Willis A.; and Wondrack, Lillian M., 5,036,013, Cl. 435-281.000.
Wong, Harvey C.: *See*—
Lin, Frank W.; Wong, Harvey C.; and Lim, Sam K., 5,036,313, Cl. 340-700.000.
Wong, Hee, to National Semiconductor Corp. Adaptive equalizer. 5,036,525, Cl. 375-14.000.
Wong, Jerry: *See*—
Nagashima, Makoto; Kobayashi, Naoaki; and Wong, Jerry, 5,035,751, Cl. 134-22.100.
Wong, Patrick S.: *See*—
Ayer, Atul D.; Kuczynski, Anthony L.; and Wong, Patrick S., 5,035,897, Cl. 424-473.000.
Wood, Donald L.: *See*—
Merrill, Connie L.; and Wood, Donald L., 5,035,838, Cl. 252-545.000.
Wood, Willis A.; and Wondrack, Lillian M., to Salk Institute Biotechnology/Industrial Associates, Inc., The. Aqueous-soluble polymeric coal substrate for depolymerization by a lignin peroxidase. 5,036,013, Cl. 435-281.000.
Woods, John H.: *See*—
Baker, Timothy J.; and Woods, John H., 5,035,946, Cl. 428-327.000.
Woodward, Lee A., to Outboard Marine Corporation. Outboard motor carrier. 5,035,437, Cl. 280-40.000.
Woodward, William S., to Curtin Matheson Scientific, Inc. Method and system for digital measurement of acoustic burst travel time in a fluid medium. 5,035,147, Cl. 73-861.280.
Wool Development International Limited: *See*—
Hageman, Paul, 5,035,199, Cl. 118-681.000.
Wrench, Edwin H., Jr.; and Higgins, Alan L., to ITT Corporation. Real-time speech processing development system. 5,036,539, Cl. 381-43.000.
Wright, Antony P.: *See*—
Chung, Kyuha; Wright, Antony P.; and Yeh, Ming-Hsiung, 5,036,117, Cl. 522-172.000.
Wright, John G., to Inkwell (UK) Limited. Ribbon reinking machine. 5,035,522, Cl. 400-197.000.
Wroblewski, Thomas R., to Chrysler Corporation. Smart multiple switch scanner, single wire bus multiplex system therefor. 5,036,320, Cl. 341-26.000.
Wu, Chengjiu, to Allied-Signal Inc. Process for making electro-optically active polymers. 5,036,142, Cl. 525-348.000.
Wuerzer, Bruno: *See*—
Hagen, Helmut; Pfister, Juergen; Eichenauer, Ulrich; Wuerzer, Bruno; Helbig, Wilfried; and Westphalen, Karl-Otto, 5,035,736, Cl. 71-98.000.
Wuonola, Mark A.: *See*—
Wang, Chia-Lin J.; and Wuonola, Mark A., 5,036,092, Cl. 514-376.000.

Wang, Chia-Lin J.; and Wuonola, Mark A., 5,036,093, Cl. 514-376.000.
Wyss, Norbert L.: *See*—
Lambert, Robert D.; Eves, Edward W., III; and Wyss, Norbert L., 5,035,704, Cl. 606-182.000.
XAAR Ltd.: *See*—
Michaelis, A. John; and Paton, A. David, 5,036,241, Cl. 310-358.000.
Xerox Corporation: *See*—
Berg, Eric; and Caruthers, Edward B., Jr., 5,036,366, Cl. 355-256.000.
Filion, Joseph L.; Sundquist, Douglas F.; Schmitt, Paul F.; Evanitsky, Eugene S.; and Warddrip, Riley L., 5,036,361, Cl. 355-209.000.
Hsieh, Bing R.; Gruber, Robert J.; Moffat, Karen A.; Mychajlowskij, Walter; and Paine, Anthony J., 5,035,970, Cl. 430-109.000.
Kleckner, Robert J., 5,036,235, Cl. 310-90.500.
Kowalczyk, Lawrence E.; Badesha, Santokh S.; Zukoski, Paul F.; Hordon, Monroe J.; Sterling, Steven M.; Lees, Barry A.; Elder, Frederick A.; and LaForce, Roger W., 5,035,857, Cl. 420-579.000.
Rezanka, Ivan, 5,036,337, Cl. 346-1.100.
Xu, Qunyin: *See*—
Anderson, Marc A.; Tunesi, Simonetta; and Xu, Qunyin, 5,035,784, Cl. 204-158.140.
Yada, Masami; Funamoto, Takao; Kitamura, Michio; Komatsu, Junzo; Midorikawa, Masakazu; and Yoshikawa, Tsugio, to Hitachi, Ltd. Water-turbine runner and process for manufacturing the same. 5,035,579, Cl. 416-241.00R.
Yada, Yukihiko, to Tokai Kogyo Kabushiki Kaisha. Molding unit for use with an automobile. 5,035,459, Cl. 296-93.000.
Yaginuma, Hideya: *See*—
Ozeki, Kohji; Tsukamoto, Yoshitsugu; Yaginuma, Hideya; and Sato, Makoto, 5,036,052, Cl. 514-19.000.
Yalata Pty Ltd: *See*—
Finley, David A. J.; Carley, Peter M.; Stokes, James R.; and Napier, Robert C., 5,035,368, Cl. 241-212.000.
Yamada, Hiroshi: *See*—
Sugino, Takao; Kawamura, Toshio; Asai, Masamichi; Yamada, Hiroshi; Mukoyama, Kenichi; Takahashi, Akira; and Hikima, Hiroshi, 5,035,919, Cl. 427-140.000.
Yamada, Keiko; Suda, Mitsunobu; Kawashima, Ichirou; and Kitagawa, Nobuhiro, to Brother Kogyo Kabushiki Kaisha. Printer with an initial sheet-setting function. 5,035,413, Cl. 271-9.000.
Yamada, Minoru; and Kobayashi, Nobuo, to Toyota Jidosha Kabushiki Kaisha. Device for changing a direction of an airstream. 5,035,359, Cl. 239-502.000.
Yamada, Taiji, to Suzuki Jidosha Kogyo Kabushika Kaisha. Engine mount apparatus. 5,035,397, Cl. 248-638.000.
Yamada, Takahiro: *See*—
Hosoya, Rituko; Yamada, Takahiro; and Musya, Masataka, 5,035,624, Cl. 434-309.000.
Yamada, Tsutoo; Morizumi, Kenichi; Kamegai, Yuji; Kanno, Yasushi; and Shibuya, Takemi, to Dai Nippon Insatsu K.K. Multi-layer parison, multi-layer bottle and apparatus for and method of manufacturing parison and bottle. 5,035,931, Cl. 428-35.700.
Yamada, Yasufumi; Nakamori, Yasutaka; Kozawa, Kiyomitsu; and Natsume, Yoshimi, to Nippondenso Co., Ltd. Piezoelectric actuator driving apparatus. 5,036,263, Cl. 318-116.000.
Yamada, Yasushi: *See*—
Haruta, Takashi; Nagano, Takaharu; Kishimoto, Takeyoshi; Yamada, Yasushi; and Yuno, Tomoko, 5,035,749, Cl. 134-2.000.
Yamada, Yoshinori: *See*—
Kobayashi, Kazuo; Yamada, Yoshinori; Morikawa, Kiyoshi; Kurumada, Masakazu; and Sugihara, Masanori, 5,036,509, Cl. 369-75.200.
Yamada, Yukio: *See*—
Tanaka, Shoji; Yamauchi, Hisao; Yamada, Yukio; Ohnuki, Masayoshi; Morita, Etsuji; Toyoshima, Mitsunobu; Wada, Yasuo; Hinoshita, Hirotaka; Ikeda, Wataru; Aihara, Etsuji; Kobayashi, Tutomu; and Suguro, Kuniaki, 5,035,597, Cl. 425-135.000.
Yamade, Yasushi: *See*—
Kamimura, Kuniaki; Sawada, Kenji; and Yamade, Yasushi, 5,036,352, Cl. 355-45.000.
Yamaguchi, Akira, to Kabushiki Kaisha Toshiba. Multiport semiconductor memory including an address comparator. 5,036,491, Cl. 365-189.070.
Yamaguchi, Atsuo: *See*—
Takahira, Kenichi; Yamaguchi, Atsuo; Furuta, Shigeru; Inoue, Takesi; Matsubara, Toshiyuki; and Fujioka, Shuzo, 5,036,460, Cl. 364-200.000.
Yamaguchi, Ikunori; and Ikenoue, Yoshikazu, to Minolta Camera Kabushiki Kaisha. Printer control system. 5,036,476, Cl. 364-519.000.
Yamaguchi, Kentaro: *See*—
Toyoshima, Yoshiki; Okada, Mitsuyuki; Fujii, Takeshi; Yamaguchi, Kentaro; and Tsuji, Mitsuji, 5,036,141, Cl. 525-286.000.
Yamaguchi, Tadao, to Tokyo Parts Electronic Co., Ltd. Flat coreless vibrator motor. 5,036,239, Cl. 310-268.000.
Yamaguchi, Takeshi, to Arco Chemical Technology, Inc. Method of controlling the pyrolysis rate of a plastic foam. 5,035,275, Cl. 164-34.000.
Yamaguchi, Yoshiharu: *See*—
Horita, Yoshiyuki; Nakayama, Kiyoshi; Sugimoto, Yasuhiko; Kikukawa, Norio; Yamaguchi, Yoshiharu; and Funakawa, Shigeru, 5,035,029, Cl. 24-394.000.
Yamaguchi, Yoshihiro; and Kuorkawa, Iwao, to Kabushiki Kaisha Komatsu Seisakusho. Plasma arc cutter and method of controlling the same. 5,036,176, Cl. 219-121.440.
Yamaha Corporation: *See*—
Kato, Mitsumi, 5,036,541, Cl. 381-62.000.
Noro, Masao, 5,036,228, Cl. 307-491.000.
Yamaha, Takahisa, 5,036,382, Cl. 357-71.000.
Yamaha Hatsudoki Kabushiki Kaisha: *See*—
Sakurai, Kenichi; and Ueda, Kazutoshi, 5,035,207, Cl. 123-41.100.
Yamaha, Takahisa, to Yamaha Corporation. Semiconductor device having a multi-level wiring structure. 5,036,382, Cl. 357-71.000.
Yamahira, Yutaka: *See*—
Moriyama, Masashi; Yamahira, Yutaka; and Matsuyama, Yuji, 5,035,200, Cl. 118-693.000.
Yamaichi Electric Manufacturing Co., Ltd.: *See*—
Matsuoka, Noriyuki, 5,035,629, Cl. 439-70.000.
Yamakawa, Akira; Sakanoue, Hitoyuki; and Takeuchi, Hisao, to Sumitomo Electric Industries, Ltd. Sintered body of aluminum nitride and method for producing the same. 5,036,026, Cl. 501-96.000.
Yamakawa, Kimio: *See*—
Mine, Katsutoshi; Kogo, Akemi; Yamakawa, Kimio; and Nakayoshi, Kazumi, 5,036,024, Cl. 437-211.000.
Yamamoto, Haruo: *See*—
Shibanaka, Mitsugu; and Yamamoto, Haruo, 5,035,414, Cl. 271-227.000.
Yamamoto, Katsuyuki: *See*—
Fujita, Shigeru; Saito, Hideo; Yamamoto, Katsuyuki; Endo, Satoshi; and Kamahora, Fumio, 5,035,598, Cl. 425-144.000.
Yamamoto, Kimio: *See*—
Yamasaki, Kazuyuki; Yamamoto, Kimio; Watanabe, Masanobu; Kan, Kojiro; and Nakayama, Yoshio, 5,035,802, Cl. 210-440.000.
Yamamoto, Masaru: *See*—
Shibata, Masanori; Yamamoto, Masaru; Okimoto, Haruo; and Tashima, Seiji, 5,035,114, Cl. 60-612.000.
Yamamoto, Yukio; and Sugiura, Masahiro, to Yoshida Kogyo K.K. Double-hung window. 5,035,081, Cl. 49-161.000.
Yamanaka, Toshimasa, to Asahi Kogaku Kogyo K.K. Camera with side-mounted balancer. 5,036,343, Cl. 354-82.000.
Yamane, Hiroyuki; and Higuchi, Yasushi, to Nippondenso Co., Ltd. Method of producing a complementary-type semiconductor device. 5,036,019, Cl. 437-57.000.
Yamasaki, Kazuyuki; Yamamoto, Kimio; Watanabe, Masanobu; Kan, Kojiro; and Nakayama, Yoshio, to Mitsui Petrochemical Industries, Ltd. Membrane filter material having excellent organic solvent resistance, method for formation of membrane filter and process for preparation of bismaleimide polymer to be used for membrane filter. 5,035,802, Cl. 210-440.000.
Yamashita, Masakazu, to Pioneer Electronic Corporation. Tilting mechanism for optical pickup unit. 5,036,507, Cl. 369-44.320.
Yamato Mishin Seizo Kabushiki Kaisha: *See*—
Yokoyama, Ryuiti, 5,035,191, Cl. 112-104.000.
Yamauchi, Hisao: *See*—
Tanaka, Shoji; Yamauchi, Hisao; Yamada, Yukio; Ohnuki, Masayoshi; Morita, Etsuji; Toyoshima, Mitsunobu; Wada, Yasuo; Hinoshita, Hirotaka; Ikeda, Wataru; Aihara, Etsuji; Kobayashi, Tutomu; and Suguro, Kuniaki, 5,035,597, Cl. 425-135.000.
Yamauchi, Jun-Ichi: *See*—
Uemura, Katsuoki; Ando, Masaru; Yamauchi, Jun-Ichi; and Akutsu, Yoshinori, 5,035,849, Cl. 264-255.000.
Yamauchi, Takashi: *See*—
Hasegawa, Morihiro; and Yamauchi, Takashi, 5,035,278, Cl. 164-428.000.
Yamazaki, Masayuki: *See*—
Nishiyama, Koji; Yamazaki, Masayuki; Tsukuda, Takeshi; and Arai, Youtaro, 5,035,744, Cl. 106-1.230.
Yamazaki Mazak Kabushiki Kaisha: *See*—
Shimizu, Norihiko; Sato, Kanji; Saiki, Toru; Goto, Kunio; Matsubara, Masuo; and Wada, Hiroshi, 5,035,410, Cl. 269-136.000.
Yamazaki, Shunpei, to Semiconductor Energy Laboratory Co., Ltd. Electric device with grains and an insulating layer. 5,036,373, Cl. 357-17.000.
Yanagita, Satoshi: *See*—
Kamigaki, Tomoo; Tokunaga, Ichiro; Yanagita, Satoshi; and Hayasaka, Koro, 5,035,960, Cl. 428-694.000.
Yang, Swe-Wong: *See*—
Jackson, Melvin R.; Prugar, Mark L.; Yang, Swe-Wong; Rairden, John R., III; and Gigliotti, Michael F. X., Jr., 5,035,958, Cl. 428-553.000.
Yankosky, James A.: *See*—
Busch, Robert E.; Hovis, William P.; Redman, Theodore M.; Thoma, Endre P.; and Yankosky, James A., 5,036,495, Cl. 365-233.000.
Yasuda, Akihiro: *See*—
Nakada, Kazuhiko; Yasuda, Akihiro; and Ichikawa, Makoto, 5,035,710, Cl. 623-6.000.
Yasufuku, Yoshitaka: *See*—
Koyama, Noboru; Nakano, Yasushi; Yasufuku, Yoshitaka; Kawahara, Setsuko; Namiki, Takemasa; Kawabe, Shigetoshi; and Umemura, Masahiro, 5,035,856, Cl. 428-328.000.
Yasumoto, Yoshio; Kageyama, Sadashi; Inoue, Syuji; Abe, Yoshio; and Uwabata, Hideyo, to Matsushita Electric Industrial Co., Ltd. Television signal processing apparatus. 5,036,386, Cl. 358-12.000.
Yatomi, Takeshi: *See*—
Iwasaki, Takeshi; Yatomi, Takeshi; and Sakai, Akihiro, 5,036,174, Cl. 219-69.120.

Yavorsky, Paul M., to United States of America, Interior. Method of extracting coal from a coal refuse pile. 5,035,722, Cl. 44-605.000.
Yazaki Corporation: *See—*
Nakazato, Wataru; Muraoka, Kunihiko; Inaba, Shigemitsu; Ohtaka, Kazuto; and Takagishi, Takashi, 5,035,644, Cl. 439-372.000.
Yeh, Ming-Hsiung: *See—*
Chung, Kyuha; Wright, Antony P.; and Yeh, Ming-Hsiung, 5,036,117, Cl. 522-172.000.
Yiskis, Eric N.: *See—*
McCoy, Glenn C.; and Yiskis, Eric N., 5,036,484, Cl. 364-900.000.
Yokosuka, Naomi: *See—*
Mori, Shigeki; and Yokosuka, Naomi, 5,035,880, Cl. 424-54.000.
Yokota, Hiroshi: *See—*
Kawabata, Yasukazu; Hamaguchi, Susumu; Takahashi, Toshio; Yokota, Hiroshi; and Shibayama, Katsutoshi, 5,035,318, Cl. 198-779.000.
Yokotani, Yoichiro; Kagata, Hiroshi; Kato, Junichi; Nakatani, Seiichi; and Terada, Yukio, to Matsushita Electric Industrial Co., Ltd. Multilayer ceramic capacitive element. 5,036,424, Cl. 361-321.000.
Yokouchi, Hideya: *See—*
Aruga, Tomoe; and Yokouchi, Hideya, 5,036,417, Cl. 360-106.000.
Yokoya, Hiroaki: *See—*
Kondo, Syunichi; Yokoya, Hiroaki; and Horie, Seiji, 5,035,969, Cl. 430-83.000.
Yokoya, Satoshi: *See—*
Takao, Nobutaka; Yokoya, Satoshi; and Takagi, Kotaro, 5,036,301, Cl. 333-185.000.
Yokoyama, Kazumasa: *See—*
Nakajima, Tsunetaka; Okamoto, Tadao; Watanabe, Masahiro; and Yokoyama, Kazumasa, 5,036,072, Cl. 514-274.000.
Yokoyama, Naruo: *See—*
Baba, Shigeo; Shibata, Yukio; Kawamura, Takahiro; Takaoka, Hideo; Kimura, Tsuguo; Kousaka, Kazuo; Minato, Yoshihiro; Yokoyama, Naruo; Iida, Kozo; and Imai, Tetsuya, 5,036,035, Cl. 502-221.000.
Yokoyama, Ryuiti, to Yamato Mishin Seizo Kabushiki Kaisha. Cloth holder for automatic sewing machine. 5,035,191, Cl. 112-104.000.
Yokoyama, Tomoaki: *See—*
Toda, Kunio; Yokoyama, Tomoaki; and Nagao, Taisuke, 5,036,369, Cl. 355-298.000.
Yokozeki, Kenzo: *See—*
Majima, Eiji; Takino, Hiroaki; Izawa, Kunisuke; Yokozeki, Kenzo; and Kubota, Koji, 5,036,004, Cl. 435-116.000.
Yonese, Naoki; Nakamura, Mikio; Kawamura, Masato; and Takayama, Yukio, to Kanzaki Paper Manufacturing Co., Ltd. Heat-sensitive record material and method for producing it. 5,035,954, Cl. 428-500.000.
York, Kenneth C.: *See—*
Voigt, Allan A.; York, Kenneth C.; and Speicher, John M., 5,035,376, Cl. 244-3.210.
Yoshida, Hiroshi: *See—*
Kato, Yuichi; Yoshida, Hiroshi; and Mizusawa, Kozo, 5,035,463, Cl. 296-223.000.
Yoshida Kogyo K. K.: *See—*
Shimono, Muchiji, 5,035,267, Cl. 139-116.100.
Yoshida Kogyo K.K.: *See—*
Horita, Yoshiyuki; Nakayama, Kiyoshi; Sugimoto, Yasuhiko; Kikukawa, Norio; Yamaguchi, Yoshiharu; and Funakawa, Shigeru, 5,035,029, Cl. 24-394.000.
Yamamoto, Yukio; and Sugiura, Masahiro, 5,035,081, Cl. 49-161.000.
Yoshida, Kouichi: *See—*
Sakamoto, Jun-ichi; Onkura, Tetsuya; and Yoshida, Kouichi, 5,035,010, Cl. 4-567.000.
Yoshida, Naoki: *See—*
Morimoto, Takeshi; and Yoshida, Naoki, 5,035,790, Cl. 204-290.00R.
Yoshida, Narutaka, to Minolta Camera Kabushiki Kaisha. Image-forming apparatus and a method for a detecting developer amount therein. 5,036,358, Cl. 355-203.000.
Yoshida, Shigeo; and Fujimoto, Isamu, to Dowa Mining Co., Ltd. Photodetecting circuit with compensated integration signal. 5,036,187, Cl. 250-214.00B.
Yoshida, Shousei, to NEC Corporation. Frequency tracking circuit using samples equalized at different sampling instants of same clock period. 5,036,296, Cl. 331-17.000.
Yoshida, Susumu; Onishi, Sei; and Uchiyama, Kenji, to Pioneer Electronic Corporation. Device for detecting tape characteristics and head position. 5,036,407, Cl. 360-25.000.
Yoshida, Toru: *See—*
Nagamori, Shuichi; and Yoshida, Toru, 5,036,415, Cl. 360-104.000.
Yoshikawa, Nobuyoshi; and Asano, Hiroshi, to Teikoku Hume Pipe Co., Ltd.; and Noritake Co., Limited. Method of producing concrete composite pipe. 5,035,850, Cl. 264-256.000.
Yoshikawa, Tsugio: *See—*
Yada, Masami; Funamoto, Takao; Kitamura, Michio; Komatsu, Junzo; Midorikawa, Masakazu; and Yoshikawa, Tsugio, 5,035,579, Cl. 416-241.00R.
Yoshimura, Toru; Uchida, Akio; Ito, Takaaki; and Saruwatari, Nobuya, to Mitsubishi Mining & Cement Co., Ltd. Surge absorber. 5,036,420, Cl. 361-118.000.
Yoshinaga, Yoko: *See—*
Kuwayama, Tetsuro; Taniguchi, Naosato; Yoshinaga, Yoko; and Kushibiki, Nobuo, 5,035,473, Cl. 350-3.700.
Yoshino, Kunihisa: *See—*
Haneda, Satoshi; Shoji, Hisashi; and Yoshino, Kunihisa, 5,036,367, Cl. 355-260.000.
Yoshino, Toshikazu: *See—*
Hayashi, Ryutaro; Yoshino, Toshikazu; and Kimura, Yukio, 5,036,510, Cl. 369-283.000.
Yoshizuka, Haruo: *See—*
Takeda, Junichi; and Yoshizuka, Haruo, 5,035,683, Cl. 493-23.000.
Youla, Jean: *See—*
Leach, Robert B.; Slabinski, Chester J.; and Youla, Jean, 5,036,321, Cl. 341-33.000.
Young, Donald C., to Union Oil Company of California. Herbicide compositions. 5,035,737, Cl. 71-83.000.
Young, John S.: *See—*
More, James R.; Olsen, Arnold T.; and Young, John S., 5,035,766, Cl. 156-581.000.
Yu, Jaiwhan: *See—*
Jo, Sooin; and Yu, Jaiwhan, 5,036,227, Cl. 307-480.000.
Yudovin, Lev G.: *See—*
Lysenko, Viktor G.; and Yudovin, Lev G., 5,035,552, Cl. 408-230.000.
Yue, Lordson L.: *See—*
Le, Duc N.; Yue, Lordson L.; Costantino, Cirillo L.; Chengson, David P.; and Khan, Aurangzeb K., 5,036,528, Cl. 375-119.000.
Yumoto, Toshiyuki: *See—*
Nakayama, Hiroshi; Shimada, Hiroyuki; and Yumoto, Toshiyuki, 5,035,682, Cl. 475-66.000.
Yuno, Tomoko: *See—*
Haruta, Takashi; Nagano, Takaharu; Kishimoto, Takeyoshi; Yamada, Yasushi; and Yuno, Tomoko, 5,035,749, Cl. 134-2.000.
Zadorozhny, Nikolai A.: *See—*
Dryga, Alexandr I.; Zadorozhny, Nikolai A.; Kuzmin, Mikhail A.; and Libman, Pavel M., 5,035,142, Cl. 73-579.000.
Zajfert, Stefan S., to Lapp Insulator Company. Triaxial mount. 5,036,162, Cl. 174-43.000.
Zakich, Paul, to Dow Chemical Company, The. High tonnage rim press. 5,035,606, Cl. 425-569.000.
Zanxx, Inc.: *See—*
Forish, John A.; and Rogers, John J., 5,035,643, Cl. 439-358.000.
Zazzu, Victor: *See—*
Dingwall, Andrew G. F.; Zazzu, Victor; and Erhardt, Harry G., 5,036,219, Cl. 307-353.000.
Zdanowicz, Lawrence E.: *See—*
Bland, Gerald F.; Mondek, Martin J.; and Zdanowicz, Lawrence E., 5,035,663, Cl. 440-75.000.
Bland, Gerald F.; Mondek, Martin J.; and Zdanowicz, Lawrence E., 5,035,664, Cl. 440-75.000.
Zehnder, Beat: *See—*
Isenring, Hans P.; Zehnder, Beat; and Ziegler, Hugo, 5,036,074, Cl. 514-277.000.
Zenith Electronics Corporation: *See—*
Chen, Hsing-Yao; and Gorski, Richard M., 5,036,258, Cl. 315-382.000.
Sutton, Leroy A.; and Phoenix, Norman E., 5,036,259, Cl. 315-382.000.
Zerillo, Michael A. Remote control switch for controlling two electric supplies. 5,036,214, Cl. 307-140.000.
Zhang, Hua-Min: *See—*
Taga, Genji; Noritake, Masaki; Nakamura, Masahiro; and Zhang, Hua-Min, 5,036,030, Cl. 501-125.000.
Ziegelmeyer, James J.: *See—*
Rinehart, Michael K.; and Ziegelmeyer, James J., 5,036,126, Cl. 524-141.000.
Ziegler, Hugo: *See—*
Isenring, Hans P.; Zehnder, Beat; and Ziegler, Hugo, 5,036,074, Cl. 514-277.000.
Zielke, Henry: *See—*
Dixon, Daniel A.; Lee, Hsin; Zielke, Henry; Mysiak, Eugene J.; and Brunker, David L., 5,035,651, Cl. 439-609.000.
Zier, Donald A., Jr.: *See—*
Mazur, Robert G.; Stephenson, Robert C.; and Zier, Donald A., Jr., 5,036,271, Cl. 324-158.00P.
Zimmel, John M.; Katsaros, Mark G.; and Bunnelle, William L., to H. B. Fuller Licensing & Financing Inc. Hot-melt moisture indicator material for disposable articles. 5,035,691, Cl. 604-361.000.
Zimmer, Johannes. Device for cleaning cylindrical stencils. 5,035,177, Cl. 101-425.000.
Zimmer, Richard: *See—*
Leiber, Heinz; Schneider, Werner; Waxenberger, Erich; Klarer, Martin; Zimmer, Richard; and Burckhardt, Manfred, 5,035,295, Cl. 180-140.000.
Zimmerman, Richard H.: *See—*
Casciotti, Albert; Dery, Ronald A.; and Zimmerman, Richard H., 5,035,628, Cl. 439-66.000.
Zinnecker, Hal P. Polyolefin sheath and silicone O-ring for medical instrument. 5,035,248, Cl. 128-751.000.
Zinner GmbH Prazisionswerkzeuge: *See—*
Zinner, Karl, 5,035,545, Cl. 407-110.000.
Zinner, Karl, to Zinner GmbH Prazisionswerkzeuge. Holder for cutting tool inserts. 5,035,545, Cl. 407-110.000.
Zinser Textilmaschinen GmbH: *See—*
Grau, Gerhard; and Wieland, Rudolf, 5,035,027, Cl. 19-258.000.
Zschocher, Hartmut: *See—*
Pieper, Helmut; Zschocher, Hartmut; and Sorg, Helmut, 5,035,735, Cl. 65-134.000.
Zukoski, Paul F.: *See—*
Kowalczyk, Lawrence E.; Badesha, Santokh S.; Zukoski, Paul F.; Hordon, Monroe J.; Sterling, Steven M.; Lees, Barry A.; Elder, Frederick A.; and LaForce, Roger W., 5,035,857, Cl. 420-579.000.
Zweifel, Terry L.; and Barrios, J. Rene, to Honeywell Inc. Method and apparatus for simulating microburst windshears. 5,036,480, Cl. 364-578.000.
Zweigart, Gerhard, to Daimler-Benz Aktiengesellschaft. Folding top for vehicles and method of folding. 5,035,461, Cl. 296-107.000.
Zwilling, Gerhard: *See—*
Karetsos, Anastasios; and Zwilling, Gerhard, 5,036,487, Cl. 365-51.000.

# LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 30TH DAY OF JULY, 1991

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

AT&T Bell Laboratories: *See*—
Blonder, Greg E.; Lamola, Angelo A.; and Lieberman, Robert A., Re. 33,651, Cl. 361-291.000.

Blonder, Greg E.; Lamola, Angelo A.; and Lieberman, Robert A., to AT&T Bell Laboratories. Variable gap device and method of manufacture. Re. 33,651, Cl. 361-291.000.

Boulton, P. I. P.; and Lee, E. S., to University of Toronto Innovations Foundation. Deterministic access protocol local area network. Re. 33,650, Cl. 340-825.500.

Brown, Dennis N., to Northwest Podiatric Laboratories, Inc. Variably adjustable shoe inserts. Re. 33,648, Cl. 36-44.000.

Cetus Corporation: *See*—
Mark, David F.; Lin, Leo S.; and Lu, Shi-da Y., Re. 33,653, Cl. 424-85.100.

Fujio, Katuharu: *See*—
Yamamura, Michio; Sawai, Kiyoshi; Fujio, Katuharu; Yamamoto, Shuuichi; and Morokoshi, Hiroshi, Re. 33,652, Cl. 418-55.100.

Kawai, Kouzi, to Tomoe Technical Research Company. Butterfly valve having a function for measuring a flow rate and method of measuring a flow rate with a butterfly valve. Re. 33,649, Cl. 137-554.000.

Lamola, Angelo A.: *See*—
Blonder, Greg E.; Lamola, Angelo A.; and Lieberman, Robert A., Re. 33,651, Cl. 361-291.000.

Lee, E. S.: *See*—
Boulton, P. I. P.; and Lee, E. S., Re. 33,650, Cl. 340-825.500.

Lieberman, Robert A.: *See*—
Blonder, Greg E.; Lamola, Angelo A.; and Lieberman, Robert A., Re. 33,651, Cl. 361-291.000.

Lin, Leo S.: *See*—
Mark, David F.; Lin, Leo S.; and Lu, Shi-da Y., Re. 33,653, Cl. 424-85.100.

Lu, Shi-da Y.: *See*—
Mark, David F.; Lin, Leo S.; and Lu, Shi-da Y., Re. 33,653, Cl. 424-85.100.

Mark, David F.; Lin, Leo S.; and Lu, Shi-da Y., to Cetus Corporation. Human recombinant interleukin-2 muteins. Re. 33,653, Cl. 424-85.100.

Matsushita Electric Industrial Co., Ltd.: *See*—
Yamamura, Michio; Sawai, Kiyoshi; Fujio, Katuharu; Yamamoto, Shuuichi; and Morokoshi, Hiroshi, Re. 33,652, Cl. 418-55.100.

Morokoshi, Hiroshi: *See*—
Yamamura, Michio; Sawai, Kiyoshi; Fujio, Katuharu; Yamamoto, Shuuichi; and Morokoshi, Hiroshi, Re. 33,652, Cl. 418-55.100.

Northwest Podiatric Laboratories, Inc.: *See*—
Brown, Dennis N., Re. 33,648, Cl. 36-44.000.

Sawai, Kiyoshi: *See*—
Yamamura, Michio; Sawai, Kiyoshi; Fujio, Katuharu; Yamamoto, Shuuichi; and Morokoshi, Hiroshi, Re. 33,652, Cl. 418-55.100.

Tomoe Technical Research Company: *See*—
Kawai, Kouzi, Re. 33,649, Cl. 137-554.000.

University of Toronto Innovations Foundation: *See*—
Boulton, P. I. P.; and Lee, E. S., Re. 33,650, Cl. 340-825.500.

Yamamoto, Shuuichi: *See*—
Yamamura, Michio; Sawai, Kiyoshi; Fujio, Katuharu; Yamamoto, Shuuichi; and Morokoshi, Hiroshi, Re. 33,652, Cl. 418-55.100.

Yamamura, Michio; Sawai, Kiyoshi; Fujio, Katuharu; Yamamoto, Shuuichi; and Morokoshi, Hiroshi, to Matsushita Electric Industrial Co., Ltd. Electrically driven compressor with a peripheral housing weld. Re. 33,652, Cl. 418-55.100.

# LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

ADC Telecommunications Inc.: *See*—
Singer, Loren A., Jr., B1 4,741,711, Cl. 439-620.000.

Dispen Pak Japan Co., Inc.: *See*—
Fukushima, Tadao, B1 4,790,429, Cl. 206-219.000.

Ebert, George W., to Home Fashions, Inc. Vertical coextruded pearlescent louver for vertical blinds. B1 4,877,077, 7-30-91, Cl. 160-236.000.

Fukushima, Tadao, to Dispen Pak Japan Co., Inc. Package. B1 4,790,429, 7-30-91, Cl. 206-219.000.

Home Fashions, Inc.: *See*—
Ebert, George W., B1 4,877,077, Cl. 160-236.000.

Kamp, Anthony W., to Shell Oil Company. Down-hole drilling motor and method for directional drilling of boreholes. B1 4,492,276, 7-30-91, Cl. 175-61.000.

Lo, Chia-Chen, to Union Carbide Corporation. Preparation of aqueous polymer emulsions in the presence of hydrophobically modified hydroxyethylcellulose. B1 4,845,175, 7-30-91, Cl. 526-200.000.

Mantei, Thomas D., to Sematech, Inc. Method and apparatus for plasma etching a substrate. B1 4,483,737, 7-30-91, Cl. 156-643.000.

Sematech, Inc.: *See*—
Mantei, Thomas D., B1 4,483,737, Cl. 156-643.000.

Shell Oil Company: *See*—
Kamp, Anthony W., B1 4,492,276, Cl. 175-61.000.

Singer, Loren A., Jr., to ADC Telecommunications Inc. Modular distribution frame including protector modules adapted for break access testing. B1 4,741,711, 7-30-91, Cl. 439-620.000.

Union Carbide Corporation: *See*—
Lo, Chia-Chen, B1 4,845,175, Cl. 526-200.000.

# LIST OF DESIGN PATENTEES

Abdi, Abraham. Garment hanger. 318,573, 7-30-91, Cl. D6-317.000.

Abrams, Robert C.: *See*—
Weder, Donald E.; Weder, Erwin H., deceased; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 318,635, Cl. D11-164.000.

Alpers, Jane E.; and Greenwald, Joseph E., to General Mills, Inc. Snack food. 318,554, 7-30-91, Cl. D1-110.000.

Alpers, Jane E.; and Greenwald, Joseph E., to General Mills, Inc. Snack food. 318,555, 7-30-91, Cl. D1-110.000.

Alpers, Jane E.; Greenwald, Joseph E.; Foote, Christopher B.; MacLachlan, James J.; and Will, Robert A., to General Mills, Inc. Snack food. 318,556, 7-30-91, Cl. D1-110.000.

American Seating Company: *See*—
Chadwick, Donald T.; and Glass, Peter R., 318,577, Cl. D6-366.000.

Anderson, Tammy: *See*—
Rodrigues, Nemorio A.; and Anderson, Tammy, 318,644, Cl. D12-187.000.

Angeles Nursery Toys Inc.: *See*—
Kelly, Ray G., 318,638, Cl. D12-112.000.

Antonious, Anthony J. Wood type golf club head. 318,701, 7-30-91, Cl. D21-214.000.

Applebaum, Samuel W. Portable platform. 318,575, 7-30-91, Cl. D6-333.000.

Aquarius Water Inc.: *See—*
Shaw, Frank D., 318,594, Cl. D7-301.000.

Arato, Anthony. Protective cover for golf clubs. 318,705, 7-30-91, Cl. D21-221.000.

Asano, Shinichi, to Car Mate Manufacturing Company Limited. Vehicle gauge. 318,631, 7-30-91, Cl. D10-102.000.

Aspen Industries, Inc.: *See—*
Schultz, Sarge, 318,597, Cl. D7-590.000.

Austin, Mary E. Toothpick dispenser. 318,746, 7-30-91, Cl. D28-64.000.

Avari, S. Richard, to CTS Consolidated Technical Services, Inc. Design for an air distribution unit. 318,724, 7-30-91, Cl. D23-370.000.

Avia Group International, Inc.: *See—*
Dahlsten, Janelle, 318,564, Cl. D2-314.000.

Avid, Inc.: *See—*
Stoddard, Hannis L., III; Hull, Douglas E.; Schmidt, George; Brown, Lester; and Beigel, Michael L., 318,658, Cl. D14-116.000.

Baldwin Hardware Corporation: *See—*
Meck, Leslie A.; and Pettersson, Peter, 318,743, Cl. D26-142.000.

Barker, Gina M., to Unique Events Products Inc. Inflatable helmet. 318,747, 7-30-91, Cl. D29-15.000.

Barnett, David J., to Maxpat Trading & Marketing (Far East Limited). Egg slicer. 318,601, 7-30-91, Cl. D7-673.000.

Barrow, Theodore E. Bow sight locking pad. 318,707, 7-30-91, Cl. D22-107.000.

Bechtel, Daniel L. Pistol scope mount. 318,708, 7-30-91, Cl. D22-110.000.

Beck, Charles A. Magazine binder. 318,687, 7-30-91, Cl. D19-32.000.

Beigel, Michael L.: *See—*
Stoddard, Hannis L., III; Hull, Douglas E.; Schmidt, George; Brown, Lester; and Beigel, Michael L., 318,658, Cl. D14-116.000.

Benetton Group S.p.A.: *See—*
Scarpa, Tobia; and Scarpa, Afra B., 318,617, Cl. D9-400.000.
Scarpa, Tobia; and Scarpa, Afra B., 318,618, Cl. D9-400.000.

Benton, Mary M.: *See—*
Schultz, Cheri L.; and Benton, Mary M., 318,572, Cl. D5-53.000.

Bergstrand, John W.: *See—*
Weder, Donald E.; Weder, Erwin H., deceased; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 318,635, Cl. D11-164.000.

Bernhardt Furniture Company, Inc.: *See—*
Keller, H. Thomas, 318,587, Cl. D6-491.000.

Bezek, Don, to Kazor Systems, Inc. Display sign. 318,693, 7-30-91, Cl. D20-10.000.

Black & Decker Inc.: *See—*
Hattle, Sally A.; McCloskey, Don R.; and van Duersen, Gary, 318,603, Cl. D8-35.000.

Blatt, John A. Quick Disconnect coupling. 318,718, 7-30-91, Cl. D23-262.000.

Blatt, John A. Quick disconnect coupling. 318,719, 7-30-91, Cl. D23-262.000.

Bolk, Phyllis J.: *See—*
Weder, Donald E.; Weder, Erwin H., deceased; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 318,635, Cl. D11-164.000.

Bowker, Frank; Harris, Samuel W.; Gresham, David; and Hicks, Mark, to Hayes Microcomputer Products, Inc. Data communications peripheral. 318,655, 7-30-91, Cl. D14-107.000.

Bowker, Frank; Harris, Samuel; Gresham, David; and Hicks, Mark, to Hayes Microcomputer Products, Inc. Data communications peripheral. 318,656, 7-30-91, Cl. D14-107.000.

Braune, Sholom. Test tube. 318,728, 7-30-91, Cl. D24-224.000.

Brooks, Joe: *See—*
Osmon, Bob; and Brooks, Joe, 318,709, Cl. D22-125.000.

Brooks, Robert H. Bottle. 318,612, 7-30-91, Cl. D9-335.000.

Brown, Lester: *See—*
Stoddard, Hannis L., III; Hull, Douglas E.; Schmidt, George; Brown, Lester; and Beigel, Michael L., 318,658, Cl. D14-116.000.

Brown, Patrick W.: *See—*
Laib, Douglas M.; and Brown, Patrick W., 318,697, Cl. D21-120.000.

Bruce, William H., Jr.: *See—*
Gotham, David R.; Bruce, William H., Jr.; and Porter, Gary A., 318,686, Cl. D18-36.000.

Buchanan, Jeffery J., to Square D Company. Electrical load center enclosure. 318,652, 7-30-91, Cl. D13-160.000.

Buck, Eugene P.: *See—*
Wanvig, John D.; Taylor, Erin K.; and Buck, Eugene P., 318,557, Cl. D1-113.000.

Buecheler, Herbert: *See—*
Halm, Hans; and Buecheler, Herbert, 318,613, Cl. D9-366.000.

Buschor, Karl, to Ransburg-Gema AG. Spray gun for coating articles. 318,712, 7-30-91, Cl. D23-226.000.

Byrne, Charles, to 537988 Ontario Limited. Valance. 318,592, 7-30-91, Cl. D6-579.000.

Canon Kabushiki Kaisha: *See—*
Tanaka, Noboru; and Tosaka, Yoichi, 318,678, Cl. D16-217.000.
Tanaka, Noboru; and Yoshida, Masaaki, 318,679, Cl. D16-239.000.

Car Mate Manufacturing Company Limited: *See—*
Asano, Shinichi, 318,631, Cl. D10-102.000.

Cassity, Terrance A.: *See—*
Sharp, Jeffrey O.; Reed, Ronald H.; Cassity, Terrance A.; Chaffin, Ronald W.; and Wilgus, Frank R., 318,651, Cl. D13-160.000.

Castillo, James D., to Innovation Sports, Inc. Athletic knee brace. 318,736, 7-30-91, Cl. D24-190.000.

Cesaroni, William C.: *See—*
Retzlaff, Dean A.; and Cesaroni, William C., 318,595, Cl. D7-373.000.

Cevert, Elie P. Identification marker tip for sports articles or the like. 318,704, 7-30-91, Cl. D21-221.000.

Chadwick, Donald T.; and Glass, Peter R., to American Seating Company. Chair. 318,577, 7-30-91, Cl. D6-366.000.

Chaffin, Ronald W.: *See—*
Sharp, Jeffrey O.; Reed, Ronald H.; Cassity, Terrance A.; Chaffin, Ronald W.; and Wilgus, Frank R., 318,651, Cl. D13-160.000.

Chapin, Paul L., to Chapin, Paul Leon. Baby bottle. 318,731, 7-30-91, Cl. D24-198.000.

Chapin, Paul Leon: *See—*
Chapin, Paul L., 318,731, Cl. D24-198.000.

Chautin, Paul F. Diaper. 318,732, 7-30-91, Cl. D24-126.000.

Chesebrough-Pond's USA Co. (Conopco, Inc.): *See—*
Kipperman, Stuart R.; and Smith, Myron, 318,620, Cl. D9-403.000.

Chesebrough-Pond's USA Co. (division of Conopco, Inc.): *See—*
Kipperman, Stuart R.; and Smith, Myron, 318,619, Cl. D9-403.000.

Chiu, Bernard, to Duracraft Corporation. Portable fan heater. 318,723, 7-30-91, Cl. D23-337.000.

Cicena Ltd.: *See—*
Frisinger, Kim D., 318,663, Cl. D14-151.000.

CKD Kabushiki Kaisha: *See—*
Miyake, Kouichi; Hosoda, Kazuya; and Niwa, Hisanobu, 318,713, Cl. D23-235.000.

Clarence J. Venne, Inc.: *See—*
Venne, Clarence J., 318,621, Cl. D9-453.000.

Clodfelter, William W., Sr. Baseboard molding segment having a duplex outlet. 318,738, 7-30-91, Cl. D25-119.000.

Cohen, Wayne E.; and Kralik, Donald M., to Latin Percussion. Percussion instrument. 318,680, 7-30-91, Cl. D17-22.000.

Colgate-Palmolive Company: *See—*
Sherman, Adam, 318,611, Cl. D9-305.000.

Collins, Herbert. Cigarette lighter adaptor. 318,648, 7-30-91, Cl. D13-144.000.

Collins, Thomas J.: *See—*
Nieves, Anthony L.; and Collins, Thomas J., 318,653, Cl. D13-184.000.

Contel IPC, Inc.: *See—*
Weber, Edward W., 318,660, Cl. D14-142.000.

Cooper Industries, Inc.: *See—*
Layne, Bruce N., 318,740, Cl. D26-63.000.

Craig, Franklin J.: *See—*
Weder, Donald E.; Weder, Erwin H., deceased; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 318,635, Cl. D11-164.000.

Crivello, Sam: *See—*
Ryason, Frank P., 318,691, Cl. D20-4.000.

CTS Consolidated Technical Services, Inc.: *See—*
Avari, S. Richard, 318,724, Cl. D23-370.000.

Daenen, Robert H. C. M.: *See—*
Lillelund, Stig; Heiberg, Jakob; and Daenen, Robert H. C. M., 318,600, Cl. D7-643.000.

Dahlsten, Janelle, to Avia Group International, Inc. Shoe upper. 318,564, 7-30-91, Cl. D2-314.000.

Dalebout, William T.: *See—*
Jacobson, David L.; and Dalebout, William T., 318,699, Cl. D21-192.000.

Dart Industries Inc.: *See—*
Laib, Douglas M.; and Brown, Patrick W., 318,697, Cl. D21-120.000.
Lillelund, Stig; Heiberg, Jakob; and Daenen, Robert H. C. M., 318,600, Cl. D7-643.000.

Das, Gloria E. Brooch. 318,633, 7-30-91, Cl. D11-86.000.

Davis, Raymond L. Dumbbell. 318,700, 7-30-91, Cl. D21-197.000.

Derain, Ron. Loudspeaker stand. 318,672, 7-30-91, Cl. D14-224.000.

DeRoyal Industries, Inc.: *See—*
Zachry, Kathy W., 318,729, Cl. D24-227.000.

DiDomenico, Joseph. Jewelry display stand. 318,581, 7-30-91, Cl. D6-457.000.

Donnelly, Wilma M.: *See—*
Weder, Donald E.; Weder, Erwin H., deceased; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 318,635, Cl. D11-164.000.

Dowell, Carlos E. Lawn sprinkler. 318,711, 7-30-91, Cl. D23-214.000.

Dowse, Kent A. Sunken bathtub. 318,720, 7-30-91, Cl. D23-277.000.

DO3 Systems, Inc.: *See—*
Kleinschmidt, Robert D., 318,586, Cl. D6-487.000.

Draxler, Donald J. Head rest. 318,735, 7-30-91, Cl. D24-183.000.

Drucker, John R., to Speer Collectibles, Inc. Table lamp base. 318,741, 7-30-91, Cl. D26-110.000.

Dudley, Roger W. Christmas tree ornament with postage stamp. 318,605, 7-30-91, Cl. D11-117.000.

Duff, Terry L.; and Gundlach, William R. Shelf unit. 318,585, 7-30-91, Cl. D6-479.000.

Dumas, Jean-Louis, to La Montre Hermes, S.A. Clock. 318,624, 7-30-91, Cl. D10-28.000.

Dunn, Richard A., Sr. Grounded electric plug adapter. 318,647, 7-30-91, Cl. D13-143.000.

Duracraft Corporation: *See—*
Chiu, Bernard, 318,723, Cl. D23-337.000.

Eastern Company, The: *See—*
Weinerman, Lee S.; and Vargus, Joel T., 318,606, Cl. D8-331.000.

Eastman Kodak Company: *See—*
Gotham, David R.; Bruce, William H., Jr.; and Porter, Gary A., 318,686, Cl. D18-36.000.

Eldon Industries, Inc.: *See—*
Hofman, James, 318,692, Cl. D20-10.000.

Elkerbout, Marten F., to U.S. Philips Corporation. Epilator. 318,745, 7-30-91, Cl. D28-10.000.

Enomoto, Nobuyuki: *See—*
Mano, Kaori; and Enomoto, Nobuyuki, 318,599, Cl. D7-605.000.

Etablissements Regnault: *See—*
Regnault, Pierre, 318,688, Cl. D19-48.000.

Ethylene Corp.: *See—*
Sheridan, Michael, 318,614, Cl. 91-370.000.

Farber, Chester. License plate mounting support. 318,645, 7-30-91, Cl. D12-193.000.

Ferdi, Allan W. Eyeglass holder. 318,675, 7-30-91, Cl. D16-129.000.

Fevig, Robert J.; Holleman, Randall S.; Garrett, Rebecca A.; and Seaver, Duane L., to Structural Concepts Corporation. Display case. 318,583, 7-30-91, Cl. D6-472.000.

Fister, Lee H., Jr. Chair. 318,576, 7-30-91, Cl. D6-334.000.

Fitzpatrick, Marylynn G.; and Flanders, Rue A. High heel protector. 318,560, 7-30-91, Cl. D2-277.000.

Flanders, Rue A.: *See—*
Fitzpatrick, Marylynn G.; and Flanders, Rue A., 318,560, Cl. D2-277.000.

Fleming, Harry A., Jr.: *See—*
Wehman, Robert L.; Fleming, Harry A., Jr.; Greene, Richard Y.; Moses, Donald L.; Fosnaught, Edward F.; and Harrison, Ralph J., 318,737, Cl. D25-103.000.

Foote, Christopher B.: *See—*
Alpers, Jane E.; Greenwald, Joseph E.; Foote, Christopher B.; MacLachlan, James J.; and Will, Robert A., 318,556, Cl. D1-110.000.

Fosnaught, Edward F.: *See—*
Wehman, Robert L.; Fleming, Harry A., Jr.; Greene, Richard Y.; Moses, Donald L.; Fosnaught, Edward F.; and Harrison, Ralph J., 318,737, Cl. D25-103.000.

Frederick, Richard W. Rotating equipment alignment analysis instrument. 318,627, 7-30-91, Cl. D10-46.000.

Frisinger, Kim D., to Cicena Ltd. Telephone set. 318,663, 7-30-91, Cl. D14-151.000.

Fuji Photo Film Co., Ltd.: *See—*
Horikiri, Kazuhisa, 318,677, Cl. D16-209.000.

Fujino, Manami: *See—*
Ito, Masafumi; Hasegawa, Shigeru; Sube, Minoru; Watanabe, Hiroyuki; Tsunoda, Keiji; Fujino, Manami; and Iikura, Yukio, 318,665, Cl. D14-163.000.

Fujitsu Limited: *See—*
Irie, Toru; Kakiuchi, Yoshinori; and Imamura, Shinichiro, 318,684, Cl. D18-13.000.

Fuqua, Jerry W.; and Sharp, James M., Jr., to International Telecommunication Corp. Telephone base. 318,661, 7-30-91, Cl. D14-151.000.

Fuqua, Jerry W.; and Sharp, James M., Jr., to International Telecommunication Corp. Telephone base. 318,662, 7-30-91, Cl. D14-151.000.

Gaither, William W. Scratch guard for automobile doors. 318,642, 7-30-91, Cl. D12-167.000.

Garrett, Rebecca A.: *See—*
Fevig, Robert J.; Holleman, Randall S.; Garrett, Rebecca A.; and Seaver, Duane L., 318,583, Cl. D6-472.000.

Geberit AG: *See—*
Witzig, Uli, 318,574, Cl. D6-332.000.

Gebhardt, Lutz, to Rowenta-Werke GmbH. Toaster. 318,593, 7-30-91, Cl. D7-330.000.

General Electric Company, The: *See—*
Schaefer, Henry A., 318,569, Cl. D3-100.000.

General Mills, Inc.: *See—*
Alpers, Jane E.; and Greenwald, Joseph E., 318,554, Cl. D1-110.000.
Alpers, Jane E.; and Greenwald, Joseph E., 318,555, Cl. D1-110.000.
Alpers, Jane E.; Greenwald, Joseph E.; Foote, Christopher B.; MacLachlan, James J.; and Will, Robert A., 318,556, Cl. D1-110.000.
Wanvig, John D.; Taylor, Erin K.; and Buck, Eugene P., 318,557, Cl. D1-113.000.

Glass, Peter R.: *See—*
Chadwick, Donald T.; and Glass, Peter R., 318,577, Cl. D6-366.000.

Gokita, Katsuhisa, to Seikosha Co., Ltd. Ink ribbon cassette for a printer. 318,682, 7-30-91, Cl. D18-12.000.

Gotham, David R.; Bruce, William H., Jr.; and Porter, Gary A., to Eastman Kodak Company. Compact copier and printer. 318,686, 7-30-91, Cl. D18-36.000.

Greene, Richard Y.: *See—*
Wehman, Robert L.; Fleming, Harry A., Jr.; Greene, Richard Y.; Moses, Donald L.; Fosnaught, Edward F.; and Harrison, Ralph J., 318,737, Cl. D25-103.000.

Greenwald, Joseph E.: *See—*
Alpers, Jane E.; and Greenwald, Joseph E., 318,554, Cl. D1-110.000.
Alpers, Jane E.; and Greenwald, Joseph E., 318,555, Cl. D1-110.000.
Alpers, Jane E.; Greenwald, Joseph E.; Foote, Christopher B.; MacLachlan, James J.; and Will, Robert A., 318,556, Cl. D1-110.000.

Gresham, David: *See—*
Bowker, Frank; Harris, Samuel W.; Gresham, David; and Hicks, Mark, 318,655, Cl. D14-107.000.
Bowker, Frank; Harris, Samuel; Gresham, David; and Hicks, Mark, 318,656, Cl. D14-107.000.

Gundlach, William R.: *See—*
Duff, Terry L.; and Gundlach, William R., 318,585, Cl. D6-479.000.

Halm, Hans; and Buecheler, Herbert, to Henkel Kommanditgesellschaft auf Aktien. Container for dispensing liquid detergent or similar article. 318,613, 7-30-91, Cl. D9-366.000.

Hardman, Ronald P. Ornaments for toilet flush handles. 318,715, 7-30-91, Cl. D23-251.000.

Hardman, Ronald P. Ornaments for toilet flush handles. 318,716, 7-30-91, Cl. D23-251.000.

Hardware & Industrial Tool Co., Inc.: *See—*
Vosbikian, Manuel, 318,602, Cl. D8-10.000.

Harris, Samuel: *See—*
Bowker, Frank; Harris, Samuel; Gresham, David; and Hicks, Mark, 318,656, Cl. D14-107.000.

Harris, Samuel W.: *See—*
Bowker, Frank; Harris, Samuel W.; Gresham, David; and Hicks, Mark, 318,655, Cl. D14-107.000.

Harrison, Ralph J.: *See—*
Wehman, Robert L.; Fleming, Harry A., Jr.; Greene, Richard Y.; Moses, Donald L.; Fosnaught, Edward F.; and Harrison, Ralph J., 318,737, Cl. D25-103.000.

Hasegawa, Shigeru: *See—*
Ito, Masafumi; Hasegawa, Shigeru; and Sube, Minoru, 318,664, Cl. D14-156.000.
Ito, Masafumi; Hasegawa, Shigeru; Sube, Minoru; Watanabe, Hiroyuki; Tsunoda, Keiji; Fujino, Manami; and Iikura, Yukio, 318,665, Cl. D14-163.000.

Hattle, Sally A.; McCloskey, Don R.; and van Duersen, Gary, to Black & Decker Inc. Electrically powered can opener with knife sharpener. 318,603, 7-30-91, Cl. D8-35.000.

Hayes Microcomputer Products, Inc.: *See—*
Bowker, Frank; Harris, Samuel W.; Gresham, David; and Hicks, Mark, 318,655, Cl. D14-107.000.
Bowker, Frank; Harris, Samuel; Gresham, David; and Hicks, Mark, 318,656, Cl. D14-107.000.

Heiberg, Jakob: *See—*
Lillelund, Stig; Heiberg, Jakob; and Daenen, Robert H. C. M., 318,600, Cl. D7-643.000.

Henkel Kommanditgesellschaft auf Aktien: *See—*
Halm, Hans; and Buecheler, Herbert, 318,613, Cl. D9-366.000.

Henry, Donald E. Expandable golf bag. 318,566, 7-30-91, Cl. D3-37.000.

Herman Miller, Inc.: *See—*
Hollington, Geoffrey A., 318,582, Cl. D6-446.000.

Hervatin, Silvana. Combined radio and light. 318,668, 7-30-91, Cl. D14-168.000.

Hicks, Mark: *See—*
Bowker, Frank; Harris, Samuel W.; Gresham, David; and Hicks, Mark, 318,655, Cl. D14-107.000.
Bowker, Frank; Harris, Samuel; Gresham, David; and Hicks, Mark, 318,656, Cl. D14-107.000.

Highland Supply Corporation: *See—*
Weder, Donald E.; Weder, Erwin H., deceased; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 318,635, Cl. D11-164.000.

Hill, Floyd L.; and O'Neal, Billy. Artificial flower stem mounting machine. 318,604, 7-30-91, Cl. D8-61.000.

Hino, Ichiroh: *See—*
Ikeyama, Etsuro; and Hino, Ichiroh, 318,667, Cl. D14-165.000.

Hirayama, Yasuo: *See—*
Nagasaka, Yasuhiro; Hirayama, Yasuo; Wakata, Shigekazu; Yamada, Shinichi; and Tanaka, Yoshihiro, 318,649, Cl. D13-147.000.

Hirose Electric Co., Ltd.: *See—*
Matsuzaki, Shuichi, 318,650, Cl. D13-147.000.

Hitachi, Ltd.: *See—*
Takekoshi, Isamu; Shimizu, Mikio; Saito, Minoru; and Shudo, Tuyoshi, 318,726, Cl. D24-159.000.

Håkansson, Jorgen, to Perstorp AB. Portable storage bin. 318,568, 7-30-91, Cl. D3-74.000.

Hofman, James, to Eldon Industries, Inc. Shutter sign. 318,692, 7-30-91, Cl. D20-10.000.

Holleman, Randall S.: *See—*
Fevig, Robert J.; Holleman, Randall S.; Garrett, Rebecca A.; and Seaver, Duane L., 318,583, Cl. D6-472.000.

Hollington, Geoffrey A., to Herman Miller, Inc. Cabinet. 318,582, 7-30-91, Cl. D6-446.000.

Holmstrom, Berit: *See—*
Hoyer, Charlotte K.; and Holmstrom, Berit, 318,696, Cl. D21-108.000.

Honda Giken Kogyo Kabushiki Kaisha: *See—*
Shimoyama, Akira; Tairabune, Kazuyuki; and Kawase, Hiroyuki, 318,636, Cl. D12-92.000.

Honeywell Inc.: *See—*
Karbassi, Said, 318,646, Cl. D13-101.000.

Horikiri, Kazuhisa, to Fuji Photo Film Co., Ltd. Camera. 318,677, 7-30-91, Cl. D16-209.000.
Hosoda, Kazuya: *See—*
Miyake, Kouichi; Hosoda, Kazuya; and Niwa, Hisanobu, 318,713, Cl. D23-235.000.
Hoyer, Charlotte K.; and Holmstrom, Berit, to Interlego A.G. Toy building element. 318,696, 7-30-91, Cl. D21-108.000.
Huang, Don-Shih, to UMAX Data System, Inc. Image scanner. 318,654, 7-30-91, Cl. D14-107.000.
Huang, Harrison. Tape dispenser. 318,690, 7-30-91, Cl. D19-69.000.
Hull, Douglas E.: *See—*
Stoddard, Hannis L., III; Hull, Douglas E.; Schmidt, George; Brown, Lester; and Beigel, Michael L., 318,658, Cl. D14-116.000.
Igarashi, Lawrence Y. Golf putter head. 318,702, 7-30-91, Cl. D21-219.000.
Iikura, Yukio: *See—*
Ito, Masafumi; Hasegawa, Shigeru; Sube, Minoru; Watanabe, Hiroyuki; Tsunoda, Keiji; Fujino, Manami; and Iikura, Yukio, 318,665, Cl. D14-163.000.
Ikeyama, Etsuro; and Hino, Ichiroh, to Sony Corporation. Tape player. 318,667, 7-30-91, Cl. D14-165.000.
Imahashi, Takahiro. Faceter. 318,674, 7-30-91, Cl. D15-140.000.
Imai, Hiroshi; and Kawashima, Shosaku, to Olympus Optical Co., Ltd. Electronic still camera. 318,676, 7-30-91, Cl. D16-202.000.
Imamura, Shinichiro: *See—*
Irie, Toru; Kakiuchi, Yoshinori; and Imamura, Shinichiro, 318,684, Cl. D18-13.000.
Innovation Sports, Inc.: *See—*
Castillo, James D., 318,736, Cl. D24-190.000.
Interel, Inc.: *See—*
Watkins, Boyd G., 318,689, Cl. D19-64.000.
Interlego A.G.: *See—*
Hoyer, Charlotte K.; and Holmstrom, Berit, 318,696, Cl. D21-108.000.
International Business Machines Corporation: *See—*
Wiseman, John A., 318,657, Cl. D14-113.000.
International Telecommunication Corp.: *See—*
Fuqua, Jerry W.; and Sharp, James M., Jr., 318,661, Cl. D14-151.000.
Fuqua, Jerry W.; and Sharp, James M., Jr., 318,662, Cl. D14-151.000.
Irie, Toru; Kakiuchi, Yoshinori; and Imamura, Shinichiro, to Fujitsu Limited. Printer. 318,684, 7-30-91, Cl. D18-13.000.
Ito, Masafumi; Hasegawa, Shigeru; and Sube, Minoru, to Teac Corporation. Digital audio disc player. 318,664, 7-30-91, Cl. D14-156.000.
Ito, Masafumi; Hasegawa, Shigeru; Sube, Minoru; Watanabe, Hiroyuki; Tsunoda, Keiji; Fujino, Manami; and Iikura, Yukio, to TEAC Corporation. Combined tape player and tuner. 318,665, 7-30-91, Cl. D14-163.000.
ivalda spa: *See—*
Schiavo, Pietro, 318,730, Cl. D24-119.000.
Izaki, Kenzo, to Kabushiki Kaisha Toshiba. Printer for electronic computer. 318,683, 7-30-91, Cl. D18-13.000.
Jacobson, David L.; and Dalebout, William T. Treadmill. 318,699, 7-30-91, Cl. D21-192.000.
Jaeger, Eduard A. Ceiling mounted fan. 318,725, 7-30-91, Cl. D23-377.000.
James Hardie & Coy. Pty. Limited: *See—*
Schenker, John, 318,608, Cl. D8-382.000.
Japan Oxygen Co., Ltd.: *See—*
Mano, Kaori; and Enomoto, Nobuyuki, 318,599, Cl. D7-605.000.
Jimenez, Suzann, to L.A. Gear, Inc. Element of a shoe upper. 318,561, 7-30-91, Cl. D2-314.000.
Jimenez, Suzann, to L.A. Gear, Inc. Element of a shoe upper. 318,562, 7-30-91, Cl. D2-314.000.
Johnson, Charles K.: *See—*
Kearney, Thomas G.; and Johnson, Charles K., 318,565, Cl. D3-30.100.
Judson, Daniel G. Truck air deflector. 318,643, 7-30-91, Cl. D12-181.000.
Kabushiki Kaisha Toshiba: *See—*
Izaki, Kenzo, 318,683, Cl. D18-13.000.
Kakiuchi, Yoshinori: *See—*
Irie, Toru; Kakiuchi, Yoshinori; and Imamura, Shinichiro, 318,684, Cl. D18-13.000.
Karbassi, Said, to Honeywell Inc. Differential pressure transducer. 318,646, 7-30-91, Cl. D13-101.000.
Kawase, Hiroyuki: *See—*
Shimoyama, Akira; Tairabune, Kazuyuki; and Kawase, Hiroyuki, 318,636, Cl. D12-92.000.
Kawashima, Shosaku: *See—*
Imai, Hiroshi; and Kawashima, Shosaku, 318,676, Cl. D16-202.000.
Kazor Systems, Inc.: *See—*
Bezek, Don, 318,693, Cl. D20-10.000.
Kearney, Thomas G.; and Johnson, Charles K. Prophylactic container. 318,565, 7-30-91, Cl. D3-30.100.
Keller, H. Thomas, to Bernhardt Furniture Company, Inc. Furniture top. 318,587, 7-30-91, Cl. D6-491.000.
Kelly, Ray G., to Angeles Nursery Toys Inc. Tricycle. 318,638, 7-30-91, Cl. D12-112.000.
Keptel, Inc.: *See—*
Nieves, Anthony L.; and Collins, Thomas J., 318,653, Cl. D13-184.000.
Kida, Masaki, to Shachihata Industrial Co., Ltd. Stamp. 318,685, 7-30-91, Cl. D18-15.000.
Killiany, David A. Display rack. 318,591, 7-30-91, Cl. D6-566.000.
Kimberly-Clark Corporation: *See—*
Schultz, Cheri L.; and Benton, Mary M., 318,572, Cl. D5-53.000.
Kipperman, Stuart R.; and Smith, Myron, to Chesebrough-Pond's USA Co. (division of Conopco, Inc.). Combined bottle and cap. 318,619, 7-30-91, Cl. D9-403.000.
Kipperman, Stuart R.; and Smith, Myron, to Chesebrough-Pond's USA Co. (Conopco, Inc.). Combined bottle and cap. 318,620, 7-30-91, Cl. D9-403.000.
Kleinschmidt, Robert D., to DO3 Systems, Inc. Table. 318,586, 7-30-91, Cl. D6-487.000.
Koepke, Earl H., to Leggett & Platt, Incorporated. Chair control. 318,588, 7-30-91, Cl. D6-500.000.
Kohler Co.: *See—*
Kohler, Herbert V., Jr.; and Reid, Mary J., 318,722, Cl. D23-311.000.
McKeone, William C., 318,590, Cl. D6-524.000.
Reid, Mary J.; and McKeone, William C., 318,607, Cl. D8-363.000.
Reid, Mary J., 318,721, Cl. D23-280.000.
Kohler, Herbert V., Jr.; and Reid, Mary J., to Kohler Co. Plumbing fixture cover. 318,722, 7-30-91, Cl. D23-311.000.
Kralik, Donald M.: *See—*
Cohen, Wayne E.; and Kralik, Donald M., 318,680, Cl. D17-22.000.
L.A. Gear, Inc.: *See—*
Jimenez, Suzann, 318,561, Cl. D2-314.000.
Jimenez, Suzann, 318,562, Cl. D2-314.000.
La Montre Hermes, S.A.: *See—*
Dumas, Jean-Louis, 318,624, Cl. D10-28.000.
Laib, Douglas M.; and Brown, Patrick W., to Dart Industries Inc. Sand pail toy or the like. 318,697, 7-30-91, Cl. D21-120.000.
Latin Percussion: *See—*
Cohen, Wayne E.; and Kralik, Donald M., 318,680, Cl. D17-22.000.
Layne, Bruce N., to Cooper Industries, Inc. Track lighting fixture. 318,740, 7-30-91, Cl. D26-63.000.
Lee, Jung-Chao. Printed circuit board tester. 318,630, 7-30-91, Cl. D10-75.000.
Leggett & Platt, Incorporated: *See—*
Koepke, Earl H., 318,588, Cl. D6-500.000.
Leib, Roger K. Plural seating unit. 318,578, 7-30-91, Cl. D6-381.000.
Lillelund, Stig; Heiberg, Jakob; and Daenen, Robert H. C. M., to Dart Industries Inc. Combined knife, fork and spoon set. 318,600, 7-30-91, Cl. D7-643.000.
Lucas, Robert J., to Nike, Inc.; and Nike International Ltd. Heel element of a shoe. 318,563, 7-30-91, Cl. D2-314.000.
MacLachlan, James J.: *See—*
Alpers, Jane E.; Greenwald, Joseph E.; Foote, Christopher B.; MacLachlan, James J.; and Will, Robert A., 318,556, Cl. D1-110.000.
Mano, Kaori; and Enomoto, Nobuyuki, to Japan Oxygen Co., Ltd. Vacuum bottle. 318,599, 7-30-91, Cl. D7-605.000.
Martin, John, to S. C. Johnson & Son, Inc. Bottle. 318,615, 7-30-91, Cl. D9-376.000.
Marui, Kohei, to Marui Ltd. Bicycle tire. 318,637, 7-30-91, Cl. D12-136.000.
Marui Ltd.: *See—*
Marui, Kohei, 318,637, Cl. D12-136.000.
Masco Corporation of Indiana: *See—*
Spangler, Anthony G., 318,714, Cl. D23-250.000.
Spangler, Anthony G., 318,717, Cl. D23-252.000.
Matsuzaki, Shuichi, to Hirose Electric Co., Ltd. Electrical connector receptacle for a printed circuit board. 318,650, 7-30-91, Cl. D13-147.000.
Maxpat Trading & Marketing (Far East Limited): *See—*
Barnett, David J., 318,601, Cl. D7-673.000.
McCloskey, Don R.: *See—*
Hattle, Sally A.; McCloskey, Don R.; and van Duersen, Gary, 318,603, Cl. D8-35.000.
McKeone, William C., to Kohler Co. Support accessory. 318,590, 7-30-91, Cl. D6-524.000.
McKeone, William C.: *See—*
Reid, Mary J.; and McKeone, William C., 318,607, Cl. D8-363.000.
Meck, Leslie A.; and Pettersson, Peter, to Baldwin Hardware Corporation. Lamp base. 318,743, 7-30-91, Cl. D26-142.000.
Michelson, Gary K. Lumbar interbody gauge. 318,629, 7-30-91, Cl. D10-64.000.
Miller, Jack V. Supporting channel for ceiling mounted track lighting system. 318,742, 7-30-91, Cl. D26-140.000.
Mitsuse, Akinori, to Olympus Optical Co., Ltd. Tape recorder. 318,666, 7-30-91, Cl. D14-165.000.
Miyake, Kouichi; Hosoda, Kazuya; and Niwa, Hisanobu, to CKD Kabushiki Kaisha. Combined pressure regulator and filter. 318,713, 7-30-91, Cl. D23-235.000.
Morley, Darrel L.: *See—*
Santoro, Michael; and Morley, Darrel L., 318,639, Cl. D12-157.000.
Moses, Donald L.: *See—*
Wehman, Robert L.; Fleming, Harry A., Jr.; Greene, Richard Y.; Moses, Donald L.; Fosnaught, Edward F.; and Harrison, Ralph J., 318,737, Cl. D25-103.000.
Nagasaka, Yasuhiro; Hirayama, Yasuo; Wakata, Shigekazu; Yamada, Shinichi; and Tanaka, Yoshihiro, to Sumitomo Wiring Systems, Ltd. Housing for electrical connector. 318,649, 7-30-91, Cl. D13-147.000.
Nakayama, Takao, to Sony Corporation. Headphone. 318,669, 7-30-91, Cl. D14-205.000.
Naumann, Gerd, to Visaton Peter Schukat. Loudspeaker basket. 318,671, 7-30-91, Cl. D14-224.000.
Nieves, Anthony L.; and Collins, Thomas J., to Keptel, Inc. Subscriber network interface enclosure. 318,653, 7-30-91, Cl. D13-184.000.

Nike, Inc.: *See—*
Lucas, Robert J., 318,563, Cl. D2-314.000.
Nike International Ltd.: *See—*
Lucas, Robert J., 318,563, Cl. D2-314.000.
Nitta, Tomio, to Tokai Corporation. Aerosol container. 318,610, 7-30-91, Cl. D9-300.000.
Niwa, Hisanobu: *See—*
Miyake, Kouichi; Hosoda, Kazuya; and Niwa, Hisanobu, 318,713, Cl. D23-235.000.
Norman, Lowell R., to Pure Concepts, Inc. Portable structure. 318,706, 7-30-91, Cl. D21-253.000.
Olympus Optical Co., Ltd.: *See—*
Imai, Hiroshi; and Kawashima, Shosaku, 318,676, Cl. D16-202.000.
Mitsuse, Akinori, 318,666, Cl. D14-165.000.
O'Neal, Billy: *See—*
Hill, Floyd L.; and O'Neal, Billy, 318,604, Cl. D8-61.000.
Osmon, Bob; and Brooks, Joe. Retractable decoy. 318,709, 7-30-91, Cl. D22-125.000.
Otis Elevator Company: *See—*
Polacek, Richard R.; and Youla, Jean, 318,632, Cl. D10-108.000.
Palmer, Barbara L. Portable lap dresser. 318,579, 7-30-91, Cl. D6-406.000.
Perstorp AB: *See—*
Håkansson, Jorgen, 318,568, Cl. D3-74.000.
Pettersson, Peter: *See—*
Meck, Leslie A.; and Pettersson, Peter, 318,743, Cl. D26-142.000.
Piano, Anthony P., to Warner-Lambert Company. Confection. 318,558, 7-30-91, Cl. D1-127.000.
Pittsburgh Corning Corporation: *See—*
Wehman, Robert L.; Fleming, Harry A., Jr.; Greene, Richard Y.; Moses, Donald L.; Fosnaught, Edward F.; and Harrison, Ralph J., 318,737, Cl. D25-103.000.
Plough, Harold. Two spice dispenser. 318,598, 7-30-91, Cl. D7-590.000.
Polacek, Richard R.; and Youla, Jean, to Otis Elevator Company. Call button indicator and wall plate for elevators. 318,632, 7-30-91, Cl. D10-108.000.
Porter, Gary A.: *See—*
Gotham, David R.; Bruce, William H., Jr.; and Porter, Gary A., 318,686, Cl. D18-36.000.
Pure Concepts, Inc.: *See—*
Norman, Lowell R., 318,706, Cl. D21-253.000.
Quinton Instrument Company: *See—*
Wyzgala, Mark H., 318,733, Cl. D24-112.000.
Wyzgala, Mark H., 318,734, Cl. D24-112.000.
Ralston, N. O. Tennis score keeper. 318,628, 7-30-91, Cl. D10-46.100.
Ransburg-Gema AG: *See—*
Buschor, Karl, 318,712, Cl. D23-226.000.
Reed, Ronald H.: *See—*
Sharp, Jeffrey O.; Reed, Ronald H.; Cassity, Terrance A.; Chaffin, Ronald W.; and Wilgus, Frank R., 318,651, Cl. D13-160.000.
Regnault, Pierre, to Etablissements Regnault. Writing instrument. 318,688, 7-30-91, Cl. D19-48.000.
Reid, Mary J.; and McKeone, William C., to Kohler Co. Bracket or the like. 318,607, 7-30-91, Cl. D8-363.000.
Reid, Mary J., to Kohler Co. Tub or the like. 318,721, 7-30-91, Cl. D23-280.000.
Reid, Mary J.: *See—*
Kohler, Herbert V., Jr.; and Reid, Mary J., 318,722, Cl. D23-311.000.
Retzlaff, Dean A.; and Cesaroni, William C., to West Bend Company, The. Electric coffee grinder. 318,595, 7-30-91, Cl. D7-373.000.
Richards-Butts, Theresa. Portable play surface device. 318,694, 7-30-91, Cl. D21-59.000.
Roann, Charles. Toy car. 318,698, 7-30-91, Cl. D21-136.000.
Rodrigues, Nemorio A.; and Anderson, Tammy. Blind spot mirror. 318,644, 7-30-91, Cl. D12-187.000.
Rosa, John. Clapping noisemaker. 318,695, 7-30-91, Cl. D21-65.000.
Rousso, Ronald J. Video cart. 318,584, 7-30-91, Cl. D6-479.000.
Rowenta-Werke GmbH: *See—*
Gebhardt, Lutz, 318,593, Cl. D7-330.000.
Ryan, Thomas J., to Watkins Manufacturing Corporation. Tile unit. 318,739, 7-30-91, Cl. D25-138.000.
Ryason, Frank P., to Crivello, Sam. Videocassette vending machine. 318,691, 7-30-91, Cl. D20-4.000.
S. C. Johnson & Son, Inc.: *See—*
Martin, John, 318,615, Cl. D9-376.000.
Saito, Minoru: *See—*
Takekoshi, Isamu; Shimizu, Mikio; Saito, Minoru; and Shudo, Tuyoshi, 318,726, Cl. D24-159.000.
Sanodent BV: *See—*
Sletbak, Helge, 318,571, Cl. D4-104.000.
Santoro, Michael; and Morley, Darrel L. Vehicle luggage rack. 318,639, 7-30-91, Cl. D12-157.000.
Sato, Hisao. Clip driver. 318,609, 7-30-91, Cl. D8-49.000.
Savage, Corey N. Music box or the like. 318,681, 7-30-91, Cl. D17-24.000.
Scarpa, Afra B.: *See—*
Scarpa, Tobia; and Scarpa, Afra B., 318,617, Cl. D9-400.000.
Scarpa, Tobia; and Scarpa, Afra B., 318,618, Cl. D9-400.000.
Scarpa, Tobia; and Scarpa, Afra B., to Benetton Group S.p.A. Fragrance bottle. 318,617, 7-30-91, Cl. D9-400.000.
Scarpa, Tobia; and Scarpa, Afra B., to Benetton Group S.p.A. Fragrance bottle. 318,618, 7-30-91, Cl. D9-400.000.
Schaefer, Henry A., to General Electric Company, The. Carrying case for a portable radio. 318,569, 7-30-91, Cl. D3-100.000.
Schenker, John, to James Hardie & Coy. Pty. Limited. Fastening clip for planks, clipboards, or the like. 318,608, 7-30-91, Cl. D8-382.000.
Schiavo, Pietro, to ivalda spa. Cotton swab. 318,730, 7-30-91, Cl. D24-119.000.
Schmidt, George: *See—*
Stoddard, Hannis L., III; Hull, Douglas E.; Schmidt, George; Brown, Lester; and Beigel, Michael L., 318,658, Cl. D14-116.000.
Schultz, Cheri L.; and Benton, Mary M., to Kimberly-Clark Corporation. Embossed tissue or similar article. 318,572, 7-30-91, Cl. D5-53.000.
Schultz, Sarge, to Aspen Industries, Inc. Holder for a spice or salt dispenser. 318,597, 7-30-91, Cl. D7-590.000.
Schwartz, Robert W. Auxilary article carrier for a truck bed storage compartment. 318,641, 7-30-91, Cl. D12-157.000.
Seaver, Duane L.: *See—*
Fevig, Robert J.; Holleman, Randall S.; Garrett, Rebecca A.; and Seaver, Duane L., 318,583, Cl. D6-472.000.
Seikosha Co., Ltd.: *See—*
Gokita, Katsuhisa, 318,682, Cl. D18-12.000.
Sugano, Hisako, 318,623, Cl. D10-21.000.
Wada, Mitsuo, 318,622, Cl. D10-15.000.
Sergi, Paul D. Fuel line filter. 318,710, 7-30-91, Cl. D23-209.000.
Severin Montres AG: *See—*
Wunderman, Severin S., 318,626, Cl. D10-32.000.
Shachihata Industrial Co., Ltd.: *See—*
Kida, Masaki, 318,685, Cl. D18-15.000.
Sharp, James M., Jr.: *See—*
Fuqua, Jerry W.; and Sharp, James M., Jr., 318,661, Cl. D14-151.000.
Fuqua, Jerry W.; and Sharp, James M., Jr., 318,662, Cl. D14-151.000.
Sharp, Jeffrey O.; Reed, Ronald H.; Cassity, Terrance A.; Chaffin, Ronald W.; and Wilgus, Frank R., to Square D Company. Housing for an electrical load center. 318,651, 7-30-91, Cl. D13-160.000.
Shaw, Frank D., to Aquarius Water Inc. Water dispensing cabinet. 318,594, 7-30-91, Cl. D7-301.000.
Shearer, William B. Golf club head. 318,703, 7-30-91, Cl. D21-220.000.
Sheridan, Michael, to Ethylene Corp. Bottle or similar article. 318,614, 7-30-91, Cl. 91-370.000.
Sherman, Adam, to Colgate-Palmolive Company. Flexible pouch. 318,611, 7-30-91, Cl. D9-305.000.
Shimizu, Mikio: *See—*
Takekoshi, Isamu; Shimizu, Mikio; Saito, Minoru; and Shudo, Tuyoshi, 318,726, Cl. D24-159.000.
Shimoyama, Akira; Tairabune, Kazuyuki; and Kawase, Hiroyuki, to Honda Giken Kogyo Kabushiki Kaisha. Automobile. 318,636, 7-30-91, Cl. D12-92.000.
Shudo, Tuyoshi: *See—*
Takekoshi, Isamu; Shimizu, Mikio; Saito, Minoru; and Shudo, Tuyoshi, 318,726, Cl. D24-159.000.
Sjostrom, Martin. Compact disc storage unit design. 318,580, 7-30-91, Cl. D6-407.000.
Slason, Michael T. Padded knee boot. 318,559, 7-30-91, Cl. D2-272.000.
Sletbak, Helge, to Sanodent BV. Toothbrush. 318,571, 7-30-91, Cl. D4-104.000.
Smith, Myron: *See—*
Kipperman, Stuart R.; and Smith, Myron, 318,619, Cl. D9-403.000.
Kipperman, Stuart R.; and Smith, Myron, 318,620, Cl. D9-403.000.
Smith, Theophilus E. Ball bag. 318,567, 7-30-91, Cl. D3-44.000.
Sony Corporation: *See—*
Ikeyama, Etsuro; and Hino, Ichiroh, 318,667, Cl. D14-165.000.
Nakayama, Takao, 318,669, Cl. D14-205.000.
Taniguchi, Shuhei, 318,670, Cl. D14-205.000.
Yamazaki, Akira, 318,659, Cl. D14-126.000.
Spangler, Anthony G., to Masco Corporation of Indiana. Faucet handle. 318,714, 7-30-91, Cl. D23-250.000.
Spangler, Anthony G., to Masco Corporation of Indiana. Handle for a faucet. 318,717, 7-30-91, Cl. D23-252.000.
Speer Collectibles, Inc.: *See—*
Drucker, John R., 318,741, Cl. D26-110.000.
Spike, Frederick W., to Sun Brokers, Inc. Vial. 318,727, 7-30-91, Cl. D24-224.000.
Square D Company: *See—*
Buchanan, Jeffery J., 318,652, Cl. D13-160.000.
Sharp, Jeffrey O.; Reed, Ronald H.; Cassity, Terrance A.; Chaffin, Ronald W.; and Wilgus, Frank R., 318,651, Cl. D13-160.000.
Stoddard, Hannis L., III; Hull, Douglas E.; Schmidt, George; Brown, Lester; and Beigel, Michael L., to Avid, Inc. Identity tag reader. 318,658, 7-30-91, Cl. D14-116.000.
Stowell, Valerie G. Divot watch. 318,625, 7-30-91, Cl. D10-31.000.
Structural Concepts Corporation: *See—*
Fevig, Robert J.; Holleman, Randall S.; Garrett, Rebecca A.; and Seaver, Duane L., 318,583, Cl. D6-472.000.
Stuart Promotional Products, Inc.: *See—*
Walasek, Stanley, 318,570, Cl. D3-106.000.
Sube, Minoru: *See—*
Ito, Masafumi; Hasegawa, Shigeru; and Sube, Minoru, 318,664, Cl. D14-156.000.
Ito, Masafumi; Hasegawa, Shigeru; Sube, Minoru; Watanabe, Hiroyuki; Tsunoda, Keiji; Fujino, Manami; and Iikura, Yukio, 318,665, Cl. D14-163.000.
Sugano, Hisako, to Seikosha Co., Ltd. Clock. 318,623, 7-30-91, Cl. D10-21.000.

Sumitomo Wiring Systems, Ltd.: *See*—
Nagasaka, Yasuhiro; Hirayama, Yasuo; Wakata, Shigekazu; Yamada, Shinichi; and Tanaka, Yoshihiro, 318,649, Cl. D13-147.000.
Sun Brokers, Inc.: *See*—
Spike, Frederick W., 318,727, Cl. D24-224.000.
Szadkowski, Lucy: *See*—
Szadkowski, Richard, 318,589, Cl. D6-501.000.
Szadkowski, Richard, to Szadkowski, Lucy. Adjustable arm rest attachment. 318,589, 7-30-91, Cl. D6-501.000.
Tairabune, Kazuyuki: *See*—
Shimoyama, Akira; Tairabune, Kazuyuki; and Kawase, Hiroyuki, 318,636, Cl. D12-92.000.
Takekoshi, Isamu; Shimizu, Mikio; Saito, Minoru; and Shudo, Tuyoshi, to Hitachi, Ltd. Magnetic resonance imaging scanner. 318,726, 7-30-91, Cl. D24-159.000.
Tanaka, Noboru; and Tosaka, Yoichi, to Canon Kabushiki Kaisha. Single-lens reflex camera body. 318,678, 7-30-91, Cl. D16-217.000.
Tanaka, Noboru; and Yoshida, Masaaki, to Canon Kabushiki Kaisha. Electronic flash. 318,679, 7-30-91, Cl. D16-239.000.
Tanaka, Yoshihiro: *See*—
Nagasaka, Yasuhiro; Hirayama, Yasuo; Wakata, Shigekazu; Yamada, Shinichi; and Tanaka, Yoshihiro, 318,649, Cl. D13-147.000.
Taniguchi, Shuhei, to Sony Corporation. Combined earphone and remote controller. 318,670, 7-30-91, Cl. D14-205.000.
Taylor, Erin K.: *See*—
Wanvig, John D.; Taylor, Erin K.; and Buck, Eugene P., 318,557, Cl. D1-113.000.
Teac Corporation: *See*—
Ito, Masafumi; Hasegawa, Shigeru; and Sube, Minoru, 318,664, Cl. D14-156.000.
Ito, Masafumi; Hasegawa, Shigeru; Sube, Minoru; Watanabe, Hiroyuki; Tsunoda, Keiji; Fujino, Manami; and Iikura, Yukio, 318,665, Cl. D14-163.000.
Terk, Neil, to Terk Technologies Corporation. Antenna. 318,673, 7-30-91, Cl. D14-230.000.
Terk Technologies Corporation: *See*—
Terk, Neil, 318,673, Cl. D14-230.000.
Tobin, Thomas A. Christmas tree stand. 318,634, 7-30-91, Cl. D11-130.100.
Tokai Corporation: *See*—
Nitta, Tomio, 318,610, Cl. D9-300.000.
Tosaka, Yoichi: *See*—
Tanaka, Noboru; and Tosaka, Yoichi, 318,678, Cl. D16-217.000.
Tsunoda, Keiji: *See*—
Ito, Masafumi; Hasegawa, Shigeru; Sube, Minoru; Watanabe, Hiroyuki; Tsunoda, Keiji; Fujino, Manami; and Iikura, Yukio, 318,665, Cl. D14-163.000.
UMAX Data System, Inc.: *See*—
Huang, Don-Shih, 318,654, Cl. D14-107.000.
Unique Events Products Inc.: *See*—
Barker, Gina M., 318,747, Cl. D29-15.000.
U.S. Philips Corporation: *See*—
Elkerbout, Marten F., 318,745, Cl. D28-10.000.
van Duersen, Gary: *See*—
Hattle, Sally A.; McCloskey, Don R.; and van Duersen, Gary, 318,603, Cl. D8-35.000.
Vargus, Joel T.: *See*—
Weinerman, Lee S.; and Vargus, Joel T., 318,606, Cl. D8-331.000.
Venne, Clarence J., to Clarence J. Venne, Inc. Bottle cap. 318,621, 7-30-91, Cl. D9-453.000.
Visaton Peter Schukat: *See*—
Naumann, Gerd, 318,671, Cl. D14-224.000.
Vosbikian, Manuel, to Hardware & Industrial Tool Co., Inc. Handle grip for a hand tool. 318,602, 7-30-91, Cl. D8-10.000.
Wada, Mitsuo, to Seikosha Co., Ltd. Clock. 318,622, 7-30-91, Cl. D10-15.000.
Wakata, Shigekazu: *See*—
Nagasaka, Yasuhiro; Hirayama, Yasuo; Wakata, Shigekazu; Yamada, Shinichi; and Tanaka, Yoshihiro, 318,649, Cl. D13-147.000.
Walasek, Stanley, to Stuart Promotional Products, Inc. Arm band with identification holder or the like. 318,570, 7-30-91, Cl. D3-106.000.
Wanvig, John D.; Taylor, Erin K.; and Buck, Eugene P., to General Mills, Inc. Snack food product. 318,557, 7-30-91, Cl. D1-113.000.
Warnelov, Jan. Band stretcher for cartop carriers. 318,640, 7-30-91, Cl. D12-157.000.
Warner-Lambert Company: *See*—
Piano, Anthony P., 318,558, Cl. D1-127.000.
Watanabe, Hiroyuki: *See*—
Ito, Masafumi; Hasegawa, Shigeru; Sube, Minoru; Watanabe, Hiroyuki; Tsunoda, Keiji; Fujino, Manami; and Iikura, Yukio, 318,665, Cl. D14-163.000.
Watkins, Boyd G., to Interel, Inc. Learning apparatus for evaluating and developing human resource and organizational skills. 318,689, 7-30-91, Cl. D19-64.000.
Watkins Manufacturing Corporation: *See*—
Ryan, Thomas J., 318,739, Cl. D25-138.000.
Watras, Jeffery M. Ashtray. 318,744, 7-30-91, Cl. D27-106.000.
Watts, Charles W. Combined popcorn bowl and sieve. 318,596, 7-30-91, Cl. D7-505.000.
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Weder, Donald E.; Weder, Erwin H., deceased (by Weder, Donald E., Wanda M. Weder, co-executors); Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., to Highland Supply Corporation. Flower pot cover. 318,635, 7-30-91, Cl. D11-164.000.
Weder, Donald E., Wanda M. Weder, co-executors: *See*—
Weder, Donald E.; Weder, Erwin H., deceased; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 318,635, Cl. D11-164.000.
Weder, Erwin H., deceased: *See*—
Weder, Donald E.; Weder, Erwin H., deceased; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 318,635, Cl. D11-164.000.
Weder, Wanda M.: *See*—
Weder, Donald E.; Weder, Erwin H., deceased; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 318,635, Cl. D11-164.000.
Wehman, Robert L.; Fleming, Harry A., Jr.; Greene, Richard Y.; Moses, Donald L.; Fosnaught, Edward F.; and Harrison, Ralph J., to Pittsburgh Corning Corporation. Translucent end cap or the like. 318,737, 7-30-91, Cl. D25-103.000.
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West Bend Company, The: *See*—
Retzlaff, Dean A.; and Cesaroni, William C., 318,595, Cl. D7-373.000.
Wilgus, Frank R.: *See*—
Sharp, Jeffrey O.; Reed, Ronald H.; Cassity, Terrance A.; Chaffin, Ronald W.; and Wilgus, Frank R., 318,651, Cl. D13-160.000.
Will, Robert A.: *See*—
Alpers, Jane E.; Greenwald, Joseph E.; Foote, Christopher B.; MacLachlan, James J.; and Will, Robert A., 318,556, Cl. D1-110.000.
Wiseman, John A., to International Business Machines Corporation. Display for computer. 318,657, 7-30-91, Cl. D14-113.000.
Witzig, Uli, to Geberit AG. Urinal partition wall. 318,574, 7-30-91, Cl. D6-332.000.
Wunderman, Severin S., to Severin Montres AG. Wrist watch. 318,626, 7-30-91, Cl. D10-32.000.
Wyzgala, Mark H., to Quinton Instrument Company. Pull-apart sheath introducer for percutaneous catheter introduction. 318,733, 7-30-91, Cl. D24-112.000.
Wyzgala, Mark H., to Quinton Instrument Company. Pull-apart sheath introducer for percutaneous catheter introduction. 318,734, 7-30-91, Cl. D24-112.000.
Yamada, Shinichi: *See*—
Nagasaka, Yasuhiro; Hirayama, Yasuo; Wakata, Shigekazu; Yamada, Shinichi; and Tanaka, Yoshihiro, 318,649, Cl. D13-147.000.
Yamazaki, Akira, to Sony Corporation. Television receiver. 318,659, 7-30-91, Cl. D14-126.000.
Yoshida, Masaaki: *See*—
Tanaka, Noboru; and Yoshida, Masaaki, 318,679, Cl. D16-239.000.
Youla, Jean: *See*—
Polacek, Richard R.; and Youla, Jean, 318,632, Cl. D10-108.000.
Zachry, Kathy W., to DeRoyal Industries, Inc. Medical sponge tray. 318,729, 7-30-91, Cl. D24-227.000.
537988 Ontario Limited: *See*—
Byrne, Charles, 318,592, Cl. D6-579.000.

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Denholm Seeds: *See*—
Winner, Blair L., 7,609, Cl. 68.000.
Geo. I. Ball, Inc.: *See*—
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Trees, Scott C., to Geo. I. Ball, Inc. Variety of Geranium named Salmon Satisfaction. 7,610, 7-30-91, Cl. 68.000.
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van Andel, Jacob, 7,611, Cl. 68.000.
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## ISSUED JULY 30, 1991

NOTE.—First number, class; second number, subclass; third number, patent number

**CLASS 2**

2 5,034,998
104 5,034,999
123 5,035,000
125 5,035,001
152 R 5,035,002
159 5,035,003
206 5,035,004
209 5,035,005
209.1 5,035,006
227 5,035,007
239 5,035,008
414 5,035,009

**CLASS 4**

567 5,035,010
665 5,035,011

**CLASS 5**

139 5,035,012
420 5,035,013
424 5,035,014
431 5,035,015
453 5,035,016
481 5,035,017

**CLASS 8**

150 5,035,018

**CLASS 10**

152 T 5,035,019

**CLASS 15**

23 5,035,020
104.061 5,035,021
250.19 5,035,023
339 5,035,024

**CLASS 16**

97 5,035,025
288 5,035,026

**CLASS 19**

258 5,035,027

**CLASS 24**

336 5,035,028
394 5,035,029

**CLASS 26**

51.5 5,035,030
69 R 5,035,031

**CLASS 27**

4 5,035,032

**CLASS 28**

115 5,035,033

**CLASS 29**

25.01 5,035,034
25.35 5,035,035
33 C 5,035,036
113.1 5,035,037
270 5,035,038
445 5,035,039
505 5,035,040
509 5,035,041
527.4 5,035,042
596 5,035,043
603 5,035,044
623.2 5,035,045
714 5,035,046
740 5,035,047
809 5,035,048
845 5,035,049
888.02 5,035,050
890.046 5,035,052
898.054 5,035,051

**CLASS 30**

43.6 5,035,053
233 5,035,054
276 5,035,055
305 5,035,056
383 5,035,057
387 5,035,058
392 5,035,059

**CLASS 33**

228 5,035,060
430 5,035,061
533 5,035,062
561.1 5,035,063
760 5,035,064

**CLASS 34**

92 5,035,065
156 5,035,066
231 5,035,067

**CLASS 36**

3 R 5,035,068
44 Re.33,648
113 5,035,069
136 5,035,070

**CLASS 37**

94 5,035,071

**CLASS 40**

539 5,035,072
585 5,035,073

**CLASS 43**

24 5,035,074
26.2 5,035,075
37 5,035,076

**CLASS 44**

334 5,035,719
343 5,035,720
594 5,035,721
605 5,035,722

**CLASS 47**

17 5,035,077
24 5,035,078
33 5,035,079
59 5,035,080

**CLASS 49**

161 5,035,081
334 5,035,082
352 5,035,083
381 5,035,084
504 5,035,085

**CLASS 51**

49 5,035,086
131.1 5,035,087
165.71 5,035,088
293 5,035,725
309 5,035,723
5,035,724
425 5,035,089
439 5,035,090

**CLASS 52**

1 5,035,091
11 5,035,092
64 5,035,093
118 5,035,094
169.5 5,035,095
208 5,035,096
220 5,035,097
589 5,035,098
713 5,035,099
741 5,035,100

**CLASS 53**

53 5,035,101
397 5,035,102
434 5,035,103
441 5,035,104
448 5,035,105
470 5,035,106

**CLASS 55**

16 5,035,726
5,035,727
106 5,035,728
168 5,035,729
269 5,035,730
387 5,035,731

**CLASS 56**

10.4 5,035,107
13.4 5,035,108
327.1 5,035,109

**CLASS 57**

208 5,035,110
224 5,035,111

**CLASS 60**

39.823 5,035,112
390 5,035,113
612 5,035,114
712 5,035,115

**CLASS 62**

24 5,035,732
77 5,035,116
79 5,035,117
126 5,035,118
225 5,035,119
341 5,035,120
389 5,035,121
457.2 5,035,122
541 5,035,733

**CLASS 63**

14.3 5,035,123

**CLASS 65**

30.13 5,035,734
134 5,035,735

**CLASS 66**

120 5,035,124
193 5,035,125

**CLASS 70**

18 5,035,126
56 5,035,127
211 5,035,128

**CLASS 71**

83 5,035,737
88 5,035,738
91 5,035,739
93 5,035,740
98 5,035,736
113 5,035,741

**CLASS 72**

30 5,035,129
162 5,035,130
190 5,035,131
214 5,035,132
350 5,035,133
405 5,035,134
422 5,035,135
450 5,035,136

**CLASS 73**

146.5 5,035,137
204.15 5,035,138
223 5,035,139
290 V 5,035,140
296 5,035,141
579 5,035,142
598 5,035,143
602 5,035,144
744 5,035,145
861.04 5,035,146
861.28 5,035,147
862.04 5,035,148
863.23 5,035,149
864.15 5,035,150

**CLASS 74**

7 A 5,035,151
194 5,035,152
206 5,035,153
213 5,035,154
467 5,035,155
850 5,035,156
866 5,035,157
5,035,158
5,035,159
5,035,160

**CLASS 75**

623 5,035,742

**CLASS 81**

54 5,035,161
124.4 5,035,162

**CLASS 83**

80 5,035,164
86 5,035,163
618 5,035,165
801 5,035,166

**CLASS 84**

435 5,035,168

**CLASS 89**

1.34 5,035,169

**CLASS 91**

486 5,035,170

**CLASS 92**

137 5,035,171

**CLASS 98**

37 5,035,172

**CLASS 99**

323.7 5,035,173

**CLASS 015**

118 5,035,022

**CLASS 100**

52 5,035,174

**CLASS 101**

116 5,035,175
148 5,035,176
425 5,035,177
5,035,178

**CLASS 102**

202.5 5,035,179
481 5,035,180
5,035,181
5,035,182
502 5,035,183

**CLASS 104**

121 5,035,184

**CLASS 105**

424 5,035,185

**CLASS 106**

1.23 5,035,744
21 5,035,743
287.16 5,035,745
438 5,035,746
495 5,035,747
499 5,035,748

**CLASS 108**

159 5,035,186

**CLASS 109**

46 5,035,187

**CLASS 110**

345 5,035,188
346 5,035,189

**CLASS 111**

195 5,035,190

**CLASS 112**

104 5,035,191
110 5,035,192
266.1 5,035,193

**CLASS 114**

102 5,035,194

**CLASS 116**

277 5,035,195

**CLASS 118**

126 5,035,196
647 5,035,197
653 5,035,198
681 5,035,199
693 5,035,200
726 5,035,201
727 5,035,202

**CLASS 119**

96 5,035,203
99 5,035,204
168 5,035,205

**CLASS 121**

137 5,036,110

**CLASS 123**

27 GE 5,035,206
41.1 5,035,207
41.14 5,035,208
90.61 5,035,209
193 P 5,035,210
198 E 5,035,211
323 5,035,212
336 5,035,213
337 5,035,214
339 5,035,215
5,035,216
5,035,217
361 5,035,218
425 5,035,219
436 5,035,220
451 5,035,221
452 5,035,222
459 5,035,223
470 5,035,224
493 5,035,225
494 5,035,226
557 5,035,227
568 5,035,228
626 5,035,229

**CLASS 126**

263 5,035,230

**CLASS 128**

6 5,035,231
20 5,035,232
25 B 5,035,233
25 R 5,035,234
33 5,035,235
201.13 5,035,236
203.15 5,035,237
204.26 5,035,238
205.23 5,035,239
205.27 5,035,240
403 5,035,241
420.5 5,035,242
633 5,035,243
653 A 5,035,244
661.09 5,035,245
673 5,035,246
715 5,035,247
751 5,035,248
899 5,035,249

**CLASS 131**

256 5,035,250

**CLASS 132**

112 5,035,251
321 5,035,252

**CLASS 134**

2 5,035,749
7 5,035,750
22.1 5,035,751
32 5,035,752

**CLASS 135**

89 5,035,253

**CLASS 136**

249 5,035,753

**CLASS 137**

85 5,035,254
102 5,035,255
242 5,035,256
414 5,035,257
454.2 5,035,258
488 5,035,259
505.18 5,035,260
516.11 5,035,261
554 Re.33,649
607 5,035,262
615 5,035,263
625.65 5,035,264

**CLASS 138**

89 5,035,265
92 5,035,266

**CLASS 139**

116.1 5,035,267
449 5,035,268

**CLASS 141**

1 5,035,269
116 5,035,270
206 5,035,271
312 5,035,272

**CLASS 148**

159 5,035,754
304 5,035,755

**CLASS 149**

37 5,035,756
46 5,035,757

**CLASS 152**

340.1 5,035,273

**CLASS 156**

61 5,035,758
64 5,035,759
67 5,035,760
161 5,035,761
230 5,035,762
5,035,763
327 5,035,764
345 5,035,765
581 5,035,766
613 5,035,767
626 5,035,768
639 5,035,769
643 5,035,770
B1 4,483,737
646 5,035,771

**CLASS 157**

1.1 5,035,274

**CLASS 160**

236 B1 4,877,077

**CLASS 162**

72 5,035,772
347 5,035,773

**CLASS 164**

34 5,035,275
5,035,276
255 5,035,277
428 5,035,278
5,035,279
463 5,035,280

**CLASS 165**

76 5,035,281
133 5,035,282
134.1 5,035,283
146 5,035,284

**CLASS 166**

65.1 5,035,285
187 5,035,286
250 5,035,287
274 5,035,288
344 5,035,289

**CLASS 172**

1 5,035,290

**CLASS 174**

33 5,036,160
40 R 5,036,161
43 5,036,162
52.4 5,036,163
94 R 5,036,164
102 SC 5,036,165
128.1 5,036,166
256 5,036,167

**CLASS 175**

5 5,035,291
45 5,035,292
57 5,035,293
61 B1 4,492,276

**CLASS 177**

70 5,035,294

**CLASS 180**

140 5,035,295
297 5,035,296

**CLASS 181**

106 5,035,297
295 5,035,298

**CLASS 182**

212 5,035,299

**CLASS 187**

1 R 5,035,300
118 5,035,301
125 5,035,302

**CLASS 188**

1.11 5,035,303
71.1 5,035,304
71.5 5,035,305
299 5,035,306

372 5,035,307

**CLASS 192**

0.052 5,035,308
45 5,035,309
48.5 5,035,310
56 R 5,035,311
85 R 5,035,312

**CLASS 193**

2 B 5,035,313
37 5,035,314

**CLASS 198**

419.2 5,035,315
459 5,035,316
642 5,035,317
779 5,035,318

**CLASS 200**

5 R 5,036,168
61.54 5,036,169

**CLASS 202**

164 5,035,774

**CLASS 203**

12 5,035,775
19 5,035,776

**CLASS 204**

79 5,035,777
94 5,035,778
98 5,035,779
129.35 5,035,780
129.9 5,035,781
157.6 5,035,782
157.67 5,035,783
158.14 5,035,784
181.7 5,035,785
182.1 5,035,786
192.34 5,035,787
224 M 5,035,788
290 R 5,035,789
5,035,790
415 5,035,791

**CLASS 206**

6.1 5,035,319
219 5,035,320
B1 4,790,429
225 5,035,321
328 5,035,322
386 5,035,323
457 5,035,324
459 5,035,325
507 5,035,326
518 5,035,327
605 5,035,328
615 5,035,329
621.4 5,035,330

**CLASS 208**

138 5,035,792
143 5,035,793
262.1 5,035,794

**CLASS 209**

3 5,035,331

**CLASS 210**

197 5,035,795
198.1 5,035,796
232 5,035,797
5,035,798
5,035,799
440 5,035,802
469 5,035,800
490 5,035,801
656 5,035,803
671 5,035,804
689 5,035,805
701 5,035,806
711 5,035,807
728 5,035,808
5,035,809
750 5,035,810
806 5,035,811

**CLASS 211**

40 5,035,332
41 5,035,333
134 5,035,334
188 5,035,335

**CLASS 212**

166 5,035,336
196 5,035,337

**CLASS 213**

50 5,035,338

**CLASS 215**

1 C 5,035,339
11.4 5,035,340
230 5,035,341

**CLASS 219**

10.41 5,036,170
10.55 D 5,036,171
10.55 M 5,036,172
69.11 5,036,173
69.12 5,036,174
89 5,036,175
121.44 5,036,176
212 5,036,177
385 5,036,178
411 5,036,179
443 5,036,180
497 5,036,181

**CLASS 220**

23.2 5,035,342
270 5,035,343
336 5,035,344

**CLASS 222**

5 5,035,345
68 5,035,346
95 5,035,347
107 5,035,348
5,035,349
212 5,035,350
394 5,035,351
611.2 5,035,352

**CLASS 227**

2 5,035,353
7 5,035,354

**CLASS 228**

104 5,035,355

**CLASS 232**

17 5,035,356

**CLASS 235**

462 5,036,182
5,036,183
479 5,036,184
493 5,036,210

**CLASS 239**

156 5,035,357
403 5,035,358
502 5,035,359
585 5,035,360
589.1 5,035,361

**CLASS 241**

1 5,035,362
5,035,363
5 5,035,364
14 5,035,365
36 5,035,366
37.5 5,035,367
212 5,035,368

**CLASS 242**

18 DD 5,035,369
18.1 5,035,370
35.5 R 5,035,371
45 5,035,372
56 A 5,035,373
264 5,035,374

**CLASS 244**

3.12 5,035,375
3.21 5,035,376
12.1 5,035,377
49 5,035,378
129.4 5,035,379
134 A 5,035,380
164 5,035,381
190 5,035,382

**CLASS 248**

68.1 5,035,383
74.2 5,035,384
108 5,035,385
110 5,035,386
5,035,387
220.4 5,035,388
224.1 5,035,389
231 5,035,390
346 5,035,391
422.2 5,035,392
456 5,035,393
634 5,035,395
635 5,035,396
638 5,035,397
674 5,035,398

**CLASS 250**

201.5 5,036,185
205 5,036,189
208.1 5,036,186
214 B 5,036,187
216 5,036,188
223 R 5,036,190
227.21 5,036,194
229 5,036,191
231.16 5,036,192
255 5,036,193
288 5,036,195
306 5,036,196
332 5,036,197
343 5,036,198
351 5,036,199
356.2 5,036,200
363.10 5,036,201
370.05 5,036,202
370.06 5,036,203
373 5,036,204
442.1 5,036,205
467.1 5,036,206
484.1 5,036,207
487.1 5,036,208
492.2 5,036,209
495.1 5,036,211
575 5,036,212

**CLASS 251**

10 5,035,399

**CLASS 252**

8.51 5,035,812
8.551 5,035,813
8.7 5,035,814
32.7 E 5,035,815
40.5 5,035,816
47.5 5,035,817
5,035,818
49.9 5,035,819
50 5,035,820
51.5 A 5,035,821
51.5 R 5,035,822
67 5,035,823
75 5,035,824
95 5,035,825
121 5,035,826
135 5,035,827
170 5,035,828
5,035,829
171 5,035,830
5,035,831
174.15 5,035,832
182.24 5,035,833
313.1 5,035,834
500 5,035,835
511 5,035,836
512 5,035,837
545 5,035,838
587 5,035,839
632 5,035,840

**CLASS 254**

28 5,035,400

**CLASS 256**

19 5,035,401

**CLASS 260**

404.5 5,035,841

**CLASS 261**

76 5,035,842

**CLASS 264**

3.2 5,035,843
4.33 5,035,844
40.1 5,035,845
48 5,035,846
86 5,035,847
174 5,035,848
255 5,035,849
256 5,035,850
514 5,035,851

**CLASS 266**

88 5,035,402
114 5,035,403
148 5,035,404
250 5,035,405

**CLASS 267**

48 5,035,406
140.1 5,035,407
265 5,035,408

**CLASS 269**

21 5,035,409
136 5,035,410
231 5,035,411

**CLASS 270**

053 5,035,412

**CLASS 271**

9 5,035,413
227 5,035,414
265 5,035,415

**CLASS 272**

3 5,035,416
73 5,035,417
5,035,418
5,035,419
95 5,035,420
96 5,035,421

**CLASS 273**

26 R 5,035,424
60 B 5,035,425
65 EG 5,035,426
67 R 5,035,427
72 R 5,035,428
73 R 5,035,429
150 A 5,035,423
153 S 5,035,430
176 FA 5,035,432
187 A 5,035,433
326 5,035,434
418 5,035,435
439 5,035,422

**CLASS 277**

25 5,035,436

**CLASS 280**

40 5,035,437
79.5 5,035,438
81.6 5,035,439
201 5,035,440
477 5,035,441
602 5,035,442
618 5,035,443
732 5,035,444
763.1 5,035,445
775 5,035,446

**CLASS 281**

15.001 5,035,447

**CLASS 285**

94 5,035,448

**CLASS 290**

48 5,036,213

**CLASS 292**

5,035,449
92 5,035,450
96 5,035,451
125 5,035,452
336.3 5,035,453
337 5,035,454
341.17 5,035,455

**CLASS 294**

64.1 5,035,456
86.004 5,035,457

**CLASS 296**

1.1 5,035,458
93 5,035,459
95.1 5,035,460
107 5,035,461
183 5,035,462
223 5,035,463

**CLASS 297**

144 5,035,464
238 5,035,465
337 5,035,466
440 5,035,467

**CLASS 298**

562 5,035,394

**CLASS 300**

21 5,035,468

**CLASS 303**

87 5,035,469

**CLASS 307**

140 5,036,214
243 5,036,215
272.2 5,036,217
300 5,036,218
353 5,036,219
427 5,036,220
443 5,036,221
5,036,222
448 5,036,223
475 5,036,224
5,036,225
5,036,226
480 5,036,227
491 5,036,228
497 5,036,229
527 5,036,230
530 5,036,231
542 5,036,232
570 5,036,233
632 5,036,234

**CLASS 309**

269 5,036,216

**CLASS 310**

90.5 5,036,235
5,036,236
172 5,036,237
214 5,036,238
268 5,036,239
323 5,036,245
338 5,036,240
358 5,036,241

**CLASS 312**

195 5,035,470
291 5,035,471

**CLASS 313**

35 5,036,242
39 5,036,243
116 5,036,244
440 5,036,246
496 5,036,247
500 5,036,248
509 5,036,249

**CLASS 315**

8 5,036,250
10 5,036,251
111.31 5,036,252
151 5,036,253
219 5,036,254
258 5,036,255
308 5,036,256
381 5,036,257
382 5,036,258
5,036,259
384 5,036,260
411 5,036,261

**CLASS 318**

38 5,036,262
116 5,036,263
254 5,036,264
618 5,036,265
646 5,036,266

**CLASS 322**

10 5,036,267
28 5,036,268

**CLASS 323**

266 5,036,269

**CLASS 324**

96 5,036,270
158 P 5,036,271
158 R 5,036,272
158 T 5,036,273
207.16 5,036,274
207.17 5,036,275
207.21 5,036,276
235 5,036,277
304 5,036,278
307 5,036,279
308 5,036,280
309 5,036,281
318 5,036,282
375 5,036,283
433 5,036,284
546 5,036,285
661 5,036,286
700 5,036,287

**CLASS 328**

15 5,036,288
117 5,036,289
235 5,036,290

**CLASS 329**

325 5,036,291

**CLASS 330**

202 5,036,292

**CLASS 331**

1 5,036,293
1 A 5,036,294
10 5,036,295
17 5,036,296
5,036,297
23 5,036,298
25 5,036,299
143 5,036,300

**CLASS 333**

185 5,036,301
202 5,036,302

**CLASS 335**

17 5,036,303
209 5,036,304
216 5,036,305
272 5,036,368

**CLASS 338**

114 5,036,306

**CLASS 340**

487 5,036,307
540 5,036,309
569 5,036,310
572 5,036,308
600 5,036,311
679 5,036,312
700 5,036,313
717 5,036,314
721 5,036,315
728 5,036,316
783 5,036,317
825.16 5,036,318
825.5 Re.33,650

**CLASS 341**

26 5,036,320
33 5,036,321
115 5,036,319
144 5,036,322

**CLASS 342**

6 5,036,323
132 5,036,324
160 5,036,325
176 5,036,326
201 5,036,327
204 5,036,328
357 5,036,329
5,036,330
361 5,036,331
5,036,332
370 5,036,333
460 5,036,334

**CLASS 343**

767 5,036,335
789 5,036,336

**CLASS 346**

1.1 5,036,337
76 PH 5,036,338
107 R 5,036,339
140 R 5,036,340
154 5,036,341

**CLASS 350**

1.1 5,035,472
3.7 5,035,473
5,035,474
6.5 5,035,475
5,035,476
96.12 5,035,478
96.14 5,035,479
96.15 5,035,480
96.16 5,035,481
96.20 5,035,482
5,035,483
96.3 5,035,477
96.30 5,035,484
164 5,035,485
167 5,035,486
245 5,035,487
333 5,035,488
335 5,035,489
337 5,035,490
350 S 5,035,491
423 5,035,492
429 5,035,493
536 5,035,494
588 5,035,495
605 5,035,496
611 5,035,497

**CLASS 351**

116 5,035,498
153 5,035,499
226 5,035,500

**CLASS 352**

140 5,035,501

**CLASS 353**

122 5,035,502

**CLASS 354**

21 5,036,342
82 5,036,343
106 5,036,344
126 5,036,345
195.12 5,036,346
400 5,036,347
402 5,036,348
5,036,349
475 5,036,350

**CLASS 355**

38 5,036,351
45 5,036,352
72 5,036,353
75 5,036,354
5,036,355
77 5,036,356
202 5,036,357
203 5,036,358
5,036,359
208 5,036,360
209 5,036,361
245 5,036,362
246 5,036,363
251 5,036,364
256 5,036,365
5,036,366
260 5,036,367
298 5,036,369

**CLASS 356**

152 5,035,503
300 5,035,504
319 5,035,505
349 5,035,506

356 5,035,507
416 5,035,508

**CLASS 357**

4 5,036,370
16 5,036,371
5,036,372
17 5,036,373
23.2 5,036,374
23.5 5,036,378
30 5,036,376
38 5,036,377
69 5,036,379
70 5,036,380
5,036,381
71 5,036,382
5,036,383
82 5,036,384
235 5,036,375

**CLASS 358**

3 5,036,385
12 5,036,386
29 5,036,387
34 5,036,388
84 5,036,389
85 5,036,390
133 5,036,391
138 5,036,392
140 5,036,393
146 5,036,394
185 5,036,395
213.11 5,036,396
213.26 5,036,397
214 5,036,398
225 5,036,399
228 5,036,400
242 5,036,401
244 5,036,402
299 5,036,403
337 5,036,404
448 5,036,405

**CLASS 360**

25 5,036,406
5,036,407
48 5,036,408
51 5,036,409
72.2 5,036,410
85 5,036,411
5,036,412
96.5 5,036,413
5,036,414
104 5,036,415
105 5,036,416
106 5,036,417
108 5,036,418
109 5,036,419
133 5,036,421

**CLASS 361**

118 5,036,420
159 5,036,422
212 5,036,423
291 Re.33,651
321 5,036,424
5,036,425
329 5,036,426
339 5,036,427
386 5,036,428
392 5,036,429
399 5,036,430
412 5,036,431
422 5,036,432
529 5,036,433
540 5,036,434

**CLASS 362**

31 5,036,435
33 5,036,436
61 5,036,437
5,036,438
5,036,439
95 5,036,440
5,036,441
102 5,036,442
183 5,036,443
188 5,036,444
348 5,036,445
399 5,036,446
431 5,036,447

**CLASS 363**

2 5,036,448
15 5,036,449
26 5,036,450
41 5,036,451
71 5,036,452

**CLASS 364**

200 5,036,453
5,036,454
5,036,455
5,036,456
5,036,457
5,036,458
5,036,459
5,036,460
408 5,036,461
413.01 5,036,462
413.13 5,036,463
5,036,464
423 5,036,465
5,036,466
424.05 5,036,467
426.05 5,036,468
428 5,036,469
431.06 5,036,470
449 5,036,471
479 5,036,472
489 5,036,473
516 5,036,474
518 5,036,475
519 5,036,476
562 5,036,478
567 5,036,477
578 5,036,480
580 5,036,479
708 5,036,481
760 5,036,482
786 5,036,483
900 5,036,484

**CLASS 365**

29 5,036,485
49 5,036,486
51 5,036,487
52 5,036,488
73 5,036,489
151 5,036,490
189.07 5,036,491
203 5,036,492
230.03 5,036,493
5,036,494
233 5,036,495

**CLASS 366**

89 5,035,509
126 5,035,510

**CLASS 367**

35 5,036,496
120 5,036,497
125 5,036,498

**CLASS 368**

10 5,036,499
47 5,036,500
88 5,036,501
286 5,036,502

**CLASS 369**

36 5,036,503
44.12 5,036,504
44.25 5,036,505
44.28 5,036,506
44.32 5,036,507
50 5,036,508
75.2 5,036,509
283 5,036,510
284 5,036,511

**CLASS 370**

2 5,036,512
125 5,036,513

**CLASS 371**

5.5 5,036,515
16.1 5,036,516
32 5,036,518
51 5,036,514

**CLASS 372**

29 5,036,517
38 5,036,519
41 5,036,520
46 5,036,521
5,036,522

**CLASS 374**

124 5,035,511
142 5,035,512
161 5,035,513
164 5,035,514

**CLASS 375**

1 5,036,523
12 5,036,524
14 5,036,525
39 5,036,526
98 5,036,527
119 5,036,528
5,036,529

**CLASS 376**

353 5,035,852
441 5,035,853

**CLASS 378**

208 5,036,530

**CLASS 379**

58 5,036,531
5,036,532
59 5,036,533
67 5,036,534
210 5,036,535
387 5,036,536

**CLASS 380**

20 5,036,537

**CLASS 381**

43 5,036,538
5,036,539
47 5,036,540
62 5,036,541
73.1 5,036,542
94 5,036,543

**CLASS 382**

24 5,036,544
62 5,036,545
65 5,036,546

**CLASS 383**

38 5,035,515
41 5,035,516
61 5,035,517
70 5,035,518

**CLASS 384**

121 5,035,519
526 5,035,520

**CLASS 400**

17 5,035,521
197 5,035,522

**CLASS 401**

6 5,035,523
206 5,035,524
278 5,035,525

**CLASS 402**

75 5,035,526

**CLASS 403**

24 5,035,529
109 5,035,527
290 5,035,528
404 5,035,530

**CLASS 404**

12 5,035,531
41 5,035,532
64 5,035,533
81 5,035,534

**CLASS 405**

50 5,035,535
60 5,035,536
128 5,035,537
151 5,035,538
154 5,035,539
157 5,035,540
217 5,035,541
227 5,035,542

**CLASS 406**

39 5,035,543

**CLASS 407**

105 5,035,544
110 5,035,545
116 5,035,546

**CLASS 408**

6 5,035,547
68 5,035,548
132 5,035,549
204 5,035,550
224 5,035,551
230 5,035,552
241 R 5,035,553

**CLASS 409**

131 5,035,554
218 5,035,555
5,035,556
233 5,035,557

**CLASS 410**

96 5,035,558

**CLASS 411**

508 5,035,559
5,035,560

**CLASS 412**

33 5,035,561

**CLASS 414**

240 5,035,562
409 5,035,563
5,035,564
537 5,035,565
729 5,035,566
751 5,035,567
752 5,035,568
757 5,035,569
778 5,035,570
789.5 5,035,571

**CLASS 415**

12 5,035,572
173.2 5,035,573
200 5,035,574

**CLASS 416**

9 5,035,575
134.00 R 5,035,576
223 A 5,035,578
223 R 5,035,577
241 R 5,035,579

**CLASS 417**

34 5,035,580
36 5,035,581
44 5,035,582
200 5,035,583
295 5,035,584
362 5,035,585
363 5,035,586
462 5,035,587
540 5,035,588

**CLASS 418**

1 5,035,589
55.1 Re.33,652
206 5,035,590

**CLASS 420**

3 5,035,854
61 5,035,855
579 5,035,857

**CLASS 422**

21 5,035,858
28 5,035,859
61 5,035,860
64 5,035,861
68.1 5,035,862
82.05 5,035,863
99 5,035,864
5,035,865
102 5,035,866
200 5,035,867

**CLASS 423**

253 5,035,869
277 5,035,870
305 5,035,871
306 5,035,872
326 5,035,868
328 5,035,873
509 5,035,874
580 5,035,875
608 5,035,876

**CLASS 424**

5 5,035,877
10 5,035,878
49 5,035,879
54 5,035,880
5,035,881
58 5,035,882
78 5,035,883
5,035,884
5,035,885
5,035,886
85.1 Re.33,653
85.2 5,035,887
195.1 5,035,888
401 5,035,890
423 5,035,891
443 5,035,892
447 5,035,893
448 5,035,894
450 5,035,895
456 5,035,896
473 5,035,897
474 5,035,898
480 5,035,899
484 5,035,900
573 5,035,901

**CLASS 425**

40 5,035,591
64 5,035,592
85 5,035,593
116 5,035,594
131.5 5,035,595
133.1 5,035,596
135 5,035,597
144 5,035,598
150 5,035,599
161 5,035,600
371 5,035,889
429 5,035,601
468 5,035,602
522 5,035,603
525 5,035,604
564 5,035,605
569 5,035,606

**CLASS 426**

12 5,035,902
19 5,035,903
243 5,035,904
284 5,035,905
285 5,035,906
383 5,035,907
388 5,035,908
473 5,035,909
478 5,035,910
515 5,035,911
578 5,035,912
619 5,035,913
621 5,035,914
637 5,035,915

**CLASS 427**

38 5,035,916
41 5,035,917
53.1 5,035,918
140 5,035,919
202 5,035,920
226 5,035,921
239 5,035,922
255 5,035,923
299 5,035,924
386 5,035,925
393.1 5,035,926
444 5,035,927

**CLASS 428**

1 5,025,928
30 5,035,929
35.6 5,035,930
35.7 5,035,931
36.4 5,035,932
36.6 5,035,933
40 5,035,934
43 5,035,935
96 5,035,936
122 5,035,937
5,035,938
137 5,035,939
174 5,035,940
286 5,035,941
288 5,035,942
290 5,035,943
312.4 5,035,944
323 5,035,945
327 5,035,946
328 5,035,856
329 5,035,947
5,035,948
337 5,035,949
421 5,035,950
446 5,035,951
461 5,035,952
484 5,035,953
500 5,035,954
520 5,035,955
537.1 5,035,956
552 5,035,957
553 5,035,958
627 5,035,959
694 5,035,960

**CLASS 429**

30 5,035,961
40 5,035,962
103 5,035,963
120 5,035,964
124 5,035,965
130 5,035,966
147 5,035,967

**CLASS 430**

58 5,035,968
83 5,035,969
109 5,035,970
114 5,035,971
5,035,972
125 5,035,973
138 5,035,974
5,035,975
165 5,035,976
200 5,035,977
233 5,035,978
270 5,035,979
281 5,035,980
327 5,035,981
331 5,035,982
346 5,035,983
378 5,035,984
432 5,035,985
522 5,035,986
544 5,035,987
551 5,035,988
567 5,035,989
5,035,990
569 5,035,991
5,035,992
598 5,035,993

**CLASS 431**

46 5,035,607
153 5,035,608
286 5,035,609

**CLASS 432**

77 5,035,610
176 5,035,611

**CLASS 433**

3 5,035,612
6 5,035,613
21 5,035,614
39 5,035,615
72 5,035,616
102 5,035,617
5,035,618
173 5,035,619
221 5,035,620
226 5,035,621

**CLASS 434**

23 5,035,622
286 5,035,623
309 5,035,624
332 5,035,625
408 5,035,626

**CLASS 435**

2 5,035,994
4 5,035,995
6 5,035,996
5,035,997
18 5,035,998
23 5,035,999
26 5,036,000
31 5,036,001
69.1 5,036,002
70.1 5,036,003
116 5,036,004
161 5,036,005
172.1 5,036,006
240.45 5,036,007
252.1 5,036,008
253.3 5,036,009
253.5 5,036,010
255 5,036,011
262 5,036,012
281 5,036,013

**CLASS 436**

8 5,036,014

**CLASS 437**

5,036,015
31 5,036,016
41 5,036,017
43 5,036,018
57 5,036,019
60 5,036,020
62 5,036,021
81 5,036,022
184 5,036,023
211 5,036,024

**CLASS 439**

64 5,035,627
66 5,035,628
70 5,035,629
92 5,035,630
108 5,035,631
5,035,632
140 5,035,633
157 5,035,634
188 5,035,635
215 5,035,636
271 5,035,637
275 5,035,638
290 5,035,639
321 5,035,640
329 5,035,641
350 5,035,642
358 5,035,643
372 5,035,644
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536 5,035,646
557 5,035,647
595 5,035,648
607 5,035,649
609 5,035,650
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610 5,035,652
620 B1 4,741,711
622 5,035,653
679 5,035,654
699 5,035,655
733 5,035,656
748 5,035,657
5,035,658
751 5,035,659
796 5,035,660
839 5,035,661

**CLASS 440**

50 5,035,662
75 5,035,663
5,035,664

**CLASS 446**

15 5,035,665
118 5,035,666
247 5,035,667

**CLASS 449**

6 5,035,668

# CLASSIFICATION OF PATENTS

| | | |
|---|---|---|
| | **CLASS 452** | |
| 5 | | 5,035,669 |
| | | 5,035,670 |
| 37 | | 5,035,671 |
| 141 | | 5,035,672 |
| 149 | | 5,035,673 |
| 169 | | 5,035,674 |
| | **CLASS 460** | |
| 62 | | 5,035,675 |
| | **CLASS 464** | |
| 135 | | 5,035,676 |
| 138 | | 5,035,677 |
| | **CLASS 474** | |
| 50 | | 5,035,678 |
| 135 | | 5,035,679 |
| 138 | | 5,035,680 |
| 152 | | 5,035,681 |
| | **CLASS 475** | |
| 66 | | 5,035,682 |
| | **CLASS 493** | |
| 23 | | 5,035,683 |
| 342 | | 5,035,684 |
| 416 | | 5,035,685 |
| | **CLASS 501** | |
| 48 | | 5,036,025 |
| 96 | | 5,036,026 |
| | | 5,036,027 |
| | | 5,036,028 |
| 121 | | 5,036,029 |
| 125 | | 5,036,030 |
| | **CLASS 502** | |
| 10 | | 5,036,031 |
| 64 | | 5,036,033 |
| 117 | | 5,036,034 |
| 221 | | 5,036,035 |
| 260 | | 5,036,032 |
| 317 | | 5,036,036 |
| 319 | | 5,036,037 |
| 335 | | 5,036,038 |
| | **CLASS 503** | |
| 217 | | 5,036,039 |
| 227 | | 5,036,040 |
| | | 5,036,041 |
| | **CLASS 505** | |
| 1 | | 5,036,042 |
| | | 5,036,043 |
| | | 5,036,044 |
| | **CLASS 514** | |
| 12 | | 5,036,045 |
| | | 5,036,046 |
| 15 | | 5,036,047 |
| 16 | | 5,036,048 |
| 17 | | 5,036,049 |
| | | 5,036,050 |
| 18 | | 5,036,051 |
| 19 | | 5,036,052 |
| | | 5,036,053 |
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| 167 | | 5,036,061 |
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| | | 5,036,073 |
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| 323 | | 5,036,078 |
| 333 | | 5,036,079 |
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| 336 | | 5,036,081 |
| 338 | | 5,036,082 |
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| 355 | | 5,036,084 |
| 361 | | 5,036,085 |
| 367 | | 5,036,086 |
| 372 | | 5,036,087 |
| 375 | | 5,036,088 |
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| 383 | | 5,036,094 |
| 389 | | 5,036,095 |
| 398 | | 5,036,096 |
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| 414 | | 5,036,099 |
| 420 | | 5,036,100 |
| 423 | | 5,036,101 |
| 438 | | 5,036,098 |
| 455 | | 5,036,102 |
| 467 | | 5,036,103 |
| 513 | | 5,036,104 |
| 532 | | 5,036,105 |
| 643 | | 5,036,106 |
| 648 | | 5,036,107 |
| 937 | | 5,036,108 |
| | **CLASS 521** | |
| 57 | | 5,036,109 |
| 182 | | 5,036,111 |
| | **CLASS 522** | |
| 20 | | 5,036,114 |
| 31 | | 5,036,112 |
| 96 | | 5,036,113 |
| 172 | | 5,036,117 |
| | **CLASS 523** | |
| 106 | | 5,036,115 |
| 145 | | 5,036,116 |
| 212 | | 5,036,118 |
| 351 | | 5,036,119 |
| 436 | | 5,036,120 |
| | **CLASS 524** | |
| 100 | | 5,036,121 |
| 101 | | 5,036,151 |
| 141 | | 5,036,126 |
| 259 | | 5,036,122 |
| 267 | | 5,036,123 |
| 278 | | 5,036,129 |
| 298 | | 5,036,124 |
| 361 | | 5,036,143 |
| 405 | | 5,036,125 |
| 423 | | 5,036,127 |
| 440 | | 5,036,128 |
| 505 | | 5,036,130 |
| 526 | | 5,036,132 |
| | | 5,036,133 |
| 560 | | 5,036,134 |
| 786 | | 5,036,131 |
| | | 5,036,135 |
| 812 | | 5,036,136 |
| | **CLASS 525** | |
| 61 | | 5,036,137 |
| 99 | | 5,036,138 |
| 222 | | 5,036,140 |
| 286 | | 5,036,141 |
| 326.5 | | 5,036,139 |
| 348 | | 5,036,142 |
| 423 | | 5,036,144 |
| 431 | | 5,036,145 |
| 436 | | 5,036,146 |
| | **CLASS 526** | |
| 119 | | 5,036,147 |
| 169.2 | | 5,036,148 |
| 200 | B1 | 4,845,175 |
| 323.2 | | 5,036,149 |
| | **CLASS 528** | |
| 173 | | 5,036,150 |
| | **CLASS 544** | |
| 57 | | 5,036,152 |
| | **CLASS 548** | |
| 542 | | 5,036,153 |
| | **CLASS 549** | |
| 531 | | 5,036,154 |
| | **CLASS 560** | |
| 39 | | 5,036,155 |
| | **CLASS 562** | |
| 496 | | 5,036,156 |
| 623 | | 5,036,157 |
| | **CLASS 564** | |
| 300 | | 5,036,158 |
| | **CLASS 585** | |
| 275 | | 5,036,159 |
| | **CLASS 604** | |
| 96 | | 5,035,686 |
| 180 | | 5,035,687 |
| 190 | | 5,035,688 |
| 234 | | 5,035,689 |
| 361 | | 5,035,691 |
| | **CLASS 606** | |
| 12 | | 5,035,693 |
| 27 | | 5,035,694 |
| 42 | | 5,035,695 |
| 47 | | 5,035,696 |
| 67 | | 5,035,697 |
| 82 | | 5,035,698 |
| 86 | | 5,035,699 |
| 88 | | 5,035,700 |
| 143 | | 5,035,692 |
| 148 | | 5,035,701 |
| 153 | | 5,035,702 |
| 167 | | 5,035,703 |
| 182 | | 5,035,704 |
| 194 | | 5,035,705 |
| 198 | | 5,035,706 |
| 224 | | 5,035,707 |
| | **CLASS 623** | |
| 1 | | 5,035,708 |
| 2 | | 5,035,709 |
| 6 | | 5,035,710 |
| 11 | | 5,035,711 |
| 16 | | 5,035,712 |
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| 17 | | 5,035,716 |
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# CLASSIFICATION OF DESIGNS

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| D1— | 110 | 318,554 |
| | | 318,555 |
| | | 318,556 |
| | 113 | 318,557 |
| | 127 | 318,558 |
| D2— | 272 | 318,559 |
| | 277 | 318,560 |
| | 314 | 318,561 |
| | | 318,562 |
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| | | 318,564 |
| D3— | 30.1 | 318,565 |
| | 37 | 318,566 |
| | 44 | 318,567 |
| | 74 | 318,568 |
| | 100 | 318,569 |
| | 106 | 318,570 |
| D4— | 104 | 318,571 |
| D5— | 53 | 318,572 |
| D6— | 317 | 318,573 |
| | 332 | 318,574 |
| | 333 | 318,575 |
| | 334 | 318,576 |
| | 366 | 318,577 |
| | 381 | 318,578 |
| | 406 | 318,579 |
| | 407 | 318,580 |
| | 446 | 318,582 |
| | 457 | 318,581 |
| | 472 | 318,583 |
| | 479 | 318,584 |
| | | 318,585 |
| | 487 | 318,586 |
| | 491 | 318,587 |
| | 500 | 318,588 |
| | 501 | 318,589 |
| | 524 | 318,590 |
| | 566 | 318,591 |
| | 579 | 318,592 |
| D7— | 301 | 318,594 |
| | 330 | 318,593 |
| | 373 | 318,595 |
| | 505 | 318,596 |
| | 590 | 318,597 |
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| | 605 | 318,599 |
| | 643 | 318,600 |
| | 673 | 318,601 |
| D8— | 10 | 318,602 |
| | 35 | 318,603 |
| | 49 | 318,609 |
| | 61 | 318,604 |
| | 331 | 318,606 |
| | 363 | 318,607 |
| | 382 | 318,608 |
| D9— | 300 | 318,610 |
| | 305 | 318,611 |
| | 335 | 318,612 |
| | 366 | 318,613 |
| | 376 | 318,615 |
| | 400 | 318,617 |
| | | 318,618 |
| | 403 | 318,619 |
| | | 318,620 |
| | 453 | 318,621 |
| D9— | 370 | 318,614 |
| D10— | 15 | 318,622 |
| | 21 | 318,623 |
| | 28 | 318,624 |
| | 31 | 318,625 |
| | 32 | 318,626 |
| | 46 | 318,627 |
| | 46.1 | 318,628 |
| | 64 | 318,629 |
| | 75 | 318,630 |
| | 102 | 318,631 |
| | 108 | 318,632 |
| D11— | 86 | 318,633 |
| | 117 | 318,605 |
| | 130.1 | 318,634 |
| | 164 | 318,635 |
| D12— | 92 | 318,636 |
| | 112 | 318,638 |
| | 136 | 318,637 |
| | 157 | 318,639 |
| | | 318,640 |
| | | 318,641 |
| | 167 | 318,642 |
| | 181 | 318,643 |
| | 187 | 318,644 |
| | 193 | 318,645 |
| D13— | 101 | 318,646 |
| | 143 | 318,647 |
| | 144 | 318,648 |
| | 147 | 318,649 |
| | | 318,650 |
| | 160 | 318,651 |
| | | 318,652 |
| | 184 | 318,653 |
| D14— | 107 | 318,654 |
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| | 113 | 318,657 |
| | 116 | 318,658 |
| | 126 | 318,659 |
| | 142 | 318,660 |
| | 151 | 318,661 |
| | | 318,662 |
| | | 318,663 |
| | 156 | 318,664 |
| | 163 | 318,665 |
| | 165 | 318,666 |
| | | 318,667 |
| | 168 | 318,668 |
| | 205 | 318,669 |
| | | 318,670 |
| | 224 | 318,671 |
| | | 318,672 |
| | 230 | 318,673 |
| D15— | 140 | 318,674 |
| D16— | 129 | 318,675 |
| | 202 | 318,676 |
| | 209 | 318,677 |
| | 217 | 318,678 |
| | 239 | 318,679 |
| D17— | 22 | 318,680 |
| | 24 | 318,681 |
| D18— | 12 | 318,682 |
| | 13 | 318,683 |
| | | 318,684 |
| | 15 | 318,685 |
| | 36 | 318,686 |
| D19— | 32 | 318,687 |
| | 48 | 318,688 |
| | 64 | 318,689 |
| | 69 | 318,690 |
| D20— | 4 | 318,691 |
| | 10 | 318,692 |
| | | 318,693 |
| D21— | 59 | 318,694 |
| | 65 | 318,695 |
| | 108 | 318,696 |
| | 120 | 318,697 |
| | 136 | 318,698 |
| | 192 | 318,699 |
| | 197 | 318,700 |
| | 214 | 318,701 |
| | 219 | 318,702 |
| | 220 | 318,703 |
| | 221 | 318,704 |
| | | 318,705 |
| | 253 | 318,706 |
| D22— | 107 | 318,707 |
| | 110 | 318,708 |
| | 125 | 318,709 |
| D23— | 209 | 318,710 |
| | 214 | 318,711 |
| | 226 | 318,712 |
| | 235 | 318,713 |
| | 250 | 318,714 |
| | 251 | 318,715 |
| | | 318,716 |
| | 252 | 318,717 |
| | 262 | 318,718 |
| | | 318,719 |
| | 277 | 318,720 |
| | 280 | 318,721 |
| | 311 | 318,722 |
| | 337 | 318,723 |
| | 370 | 318,724 |
| | 377 | 318,725 |
| D24— | 112 | 318,733 |
| | | 318,734 |
| | 119 | 318,730 |
| | 126 | 318,732 |
| | 159 | 318,726 |
| | 183 | 318,735 |
| | 190 | 318,736 |
| | 198 | 318,731 |
| | 224 | 318,727 |
| | | 318,728 |
| | 227 | 318,729 |
| D25— | 103 | 318,737 |
| | 119 | 318,738 |
| | 138 | 318,739 |
| D26— | 63 | 318,740 |
| | 110 | 318,741 |
| | 140 | 318,742 |
| | 142 | 318,743 |
| D27— | 106 | 318,744 |
| D28— | 10 | 318,745 |
| | 64 | 318,746 |
| D29— | 15 | 318,747 |

# CLASSIFICATION OF PLANTS

| | | |
|---|---|---|
| P.— | 7 | 7,604 |
| | | 7,605 |
| | | 7,606 |
| | | 7,607 |
| | 54 | 7,608 |
| | 68 | 7,609 |
| | | 7,610 |
| | | 7,611 |

# GEOGRAPHICAL INDEX
# OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)


| | | | | | |
|---|---|---|---|---|---|
| Alabama | 1 | Kentucky | 21 | Oregon | 41 |
| Alaska | 2 | Louisiana | 22 | Pennsylvania | 42 |
| American Samoa | 3 | Maine | 23 | Puerto Rico | 43 |
| Arizona | 4 | Maryland | 24 | Rhode Island | 44 |
| Arkansas | 5 | Massachusetts | 25 | South Carolina | 45 |
| California | 6 | Michigan | 26 | South Dakota | 46 |
| Canal Zone | 7 | Minnesota | 27 | Tennessee | 47 |
| Colorado | 8 | Mississippi | 28 | Texas | 48 |
| Connecticut | 9 | Missouri | 29 | Utah | 49 |
| Delaware | 10 | Montana | 30 | Vermont | 50 |
| District of Columbia | 11 | Nebraska | 31 | Virginia | 51 |
| Florida | 12 | Nevada | 32 | Virgin Islands | 52 |
| Georgia | 13 | New Hampshire | 33 | Washington | 53 |
| Guam | 14 | New Jersey | 34 | West Virginia | 54 |
| Hawaii | 15 | New Mexico | 35 | Wisconsin | 55 |
| Idaho | 16 | New York | 36 | Wyoming | 56 |
| Illinois | 17 | North Carolina | 37 | U.S. Air Force | 57 |
| Indiana | 18 | North Dakota | 38 | U.S. Army | 58 |
| Iowa | 19 | Ohio | 39 | U.S. Navy | 59 |
| Kansas | 20 | Oklahoma | 40 | | |


(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

## PATENTS

01 : 5,035,774
5,035,941
02 : 5,035,510
04 : 5,035,002
5,035,034
5,035,128
5,035,149
5,035,352
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5,035,804
5,035,957
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5,036,456
5,036,480
05 : 5,035,357
5,036,044
06 : 5,035,000
5,035,011
5,035,037
5,035,041
5,035,062
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5,035,112
5,035,115
5,035,116
5,035,133
5,035,172
5,035,180
5,035,181
5,035,182
5,035,189
5,035,230
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5,035,238
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5,035,264
5,035,265
5,035,285
5,035,313
5,035,320
5,035,321
5,035,344
5,035,375
5,035,376
5,035,382
5,035,383
5,035,394
5,035,395
5,035,396
5,035,401
5,035,438
5,035,445
5,035,450
5,035,451
5,035,460
5,035,467
5,035,474
5,035,475
5,035,490
5,035,494
5,035,500
5,035,501
5,035,502
5,035,531
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5,035,612
5,035,619
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5,035,874
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5,035,897
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5,036,053
5,036,105
5,036,160
5,036,179
5,036,189
5,036,203
5,036,206
5,036,210
5,036,220
5,036,226
5,036,229
5,036,236
5,036,280
5,036,281
5,036,299
5,036,304
5,036,313
5,036,315
5,036,325
5,036,332
5,036,333
5,036,340
5,036,371
5,036,423
5,036,428
5,036,444
5,036,454
5,036,455
5,036,457
5,036,479
5,036,482
5,036,492
5,036,493
5,036,511
5,036,525
5,036,528
5,036,539
4,877,077
08 : 5,035,003
5,035,032
5,035,104
5,035,155
5,035,263
5,035,365
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5,035,982
5,036,240
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09 : 5,035,073
5,035,301
5,035,302
5,035,353
5,035,422
5,035,625
5,035,631
5,035,645
5,035,646
5,035,707
5,035,797
5,035,811
5,035,883
5,035,903
5,035,951
5,035,961
5,036,010
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5,036,155
5,036,289
5,036,303
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5,035,761
5,035,776
5,035,830
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5,036,092
5,036,093
5,036,137
5,036,139
5,036,159
5,036,262
11 : 5,036,542
12 : 5,035,103
5,035,248
5,035,299
5,035,323
5,035,343
5,035,385
5,035,387
5,035,393
5,035,417
5,035,523
5,035,578
5,035,614
5,035,622
5,035,627
5,035,700
5,035,725
5,035,759
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5,035,929
5,036,031
5,036,201
5,036,217
5,036,310
5,036,463
5,036,488
13 : 5,035,097
5,035,169
5,035,873
5,036,005
5,036,356
5,036,527
5,036,536
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5,036,286
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5,036,012
5,036,015
5,036,416
17 : 5,035,040
5,035,042
5,035,074
5,035,106
5,035,162
5,035,170
5,035,176
5,035,185
5,035,187
5,035,209
5,035,211
5,035,212
5,035,227
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5,035,341
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5,035,559
5,035,565
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5,035,670
5,035,706
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5,035,738
5,035,806
5,035,840
5,035,858
5,035,859
5,035,861
5,035,920
5,036,051
5,036,060
5,036,116
5,036,241
5,036,242
5,036,249
5,036,253
5,036,258
5,036,259
5,036,267
5,036,284
5,036,312
5,036,448
5,036,449
5,036,451
5,036,462
5,036,512
5,036,515
5,036,531
5,036,532
5,036,540
18 : 5,035,025
5,035,085
5,035,273
5,035,364
5,035,517
5,035,643
5,035,689
5,035,704
5,035,912
5,036,047
5,036,129
5,036,194
5,036,237
5,036,257
5,036,260
5,036,261
20 : 5,034,999
5,035,671
5,035,713
5,035,795
5,035,901
5,036,355
5,036,442
21 : 5,035,098
5,035,286
22 : 5,035,363
5,035,586
5,035,775
23 : 5,036,222
24 : 5,035,049
5,035,107
5,035,208
5,035,269

5,035,361
5,035,921
5,035,994
5,035,996
5,036,107
5,036,520
5,036,523
5,036,534
25 : 5,035,013
5,035,019
5,035,141
5,035,145
5,035,201
5,035,242
5,035,429
5,035,514
5,035,723
5,035,724
5,035,792
5,035,887
5,035,923
5,036,046
5,036,177
5,036,244
5,036,298
5,036,380
5,036,398
5,036,408
5,036,436
5,036,450
5,036,489
5,036,513
5,036,518
5,036,535
26 : 5,035,001
5,035,050
5,035,083
5,035,100
5,035,134
5,035,156
5,035,158
5,035,184
5,035,214
5,035,221
5,035,254
5,035,274
5,035,277
5,035,303
5,035,345
5,035,391
5,035,408
5,035,425
5,035,458
5,035,546
5,035,588
5,035,602
5,035,626
5,035,785
5,035,796
5,035,799
5,035,827
5,035,894
5,036,054
5,036,089
5,036,096
5,036,114
5,036,117
5,036,131
5,036,275
5,036,320
5,036,437
5,036,467
27 : 5,035,044
5,035,166
5,035,195
5,035,240
5,035,266
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## DESIGN PATENTS

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| 04 : 318,709 | | 318,725 | | 318,598 | | 318,639 | 318,705 | 318,628 |
| 06 : 318,559 | | 318,731 | | 318,635 | | 318,718 | 318,724 | 318,641 |
| 318,561 | | 318,736 | | 318,644 | | 318,719 | 37 : 318,587 | 318,695 |
| 318,562 | | 318,739 | | 318,648 | 27 : | 318,554 | 318,727 | 318,699 |
| 318,567 | | 318,742 | | 318,692 | | 318,555 | 39 : 318,576 | 318,708 |
| 318,573 | 09 : | 318,619 | | 318,693 | | 318,556 | 318,591 | 51 : 318,569 |
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| 318,577 | | 318,632 | 18 : | 318,560 | | 318,566 | 318,675 | 318,605 |
| 318,578 | | 318,660 | | 318,703 | | 318,720 | 318,710 | 53 : 318,589 |
| 318,584 | 10 : | 318,603 | | 318,714 | 28 : | 318,661 | 318,746 | 318,733 |
| 318,625 | 12 : | 318,580 | | 318,717 | | 318,662 | 40 : 318,585 | 318,734 |
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| 318,634 | | 318,698 | 22 : | 318,732 | 34 : | 318,558 | 318,700 | 318,590 |
| 318,658 | | 318,735 | 23 : | 318,643 | | 318,602 | 42 : 318,570 | 318,595 |
| 318,687 | 13 : | 318,612 | 24 : | 318,642 | | 318,614 | 318,621 | 318,597 |
| 318,689 | | 318,633 | | 318,701 | | 318,645 | 318,737 | 318,607 |
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| 318,702 | | 318,656 | | 318,723 | | 318,680 | 44 : 318,581 | 318,646 |
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| 318,711 | | 318,741 | | 318,744 | 36 : | 318,673 | 47 : 318,729 | 318,722 |
| 318,715 | 17 : | 318,586 | 26 : | 318,583 | | | | |

## PLANT PATENTS

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| 06 : 7,609 | | | | | | |
| 17 : 7,610 | 24 : 7,608 | 48 : 7,604 | 7,605 | 7,606 | | 7,607 |

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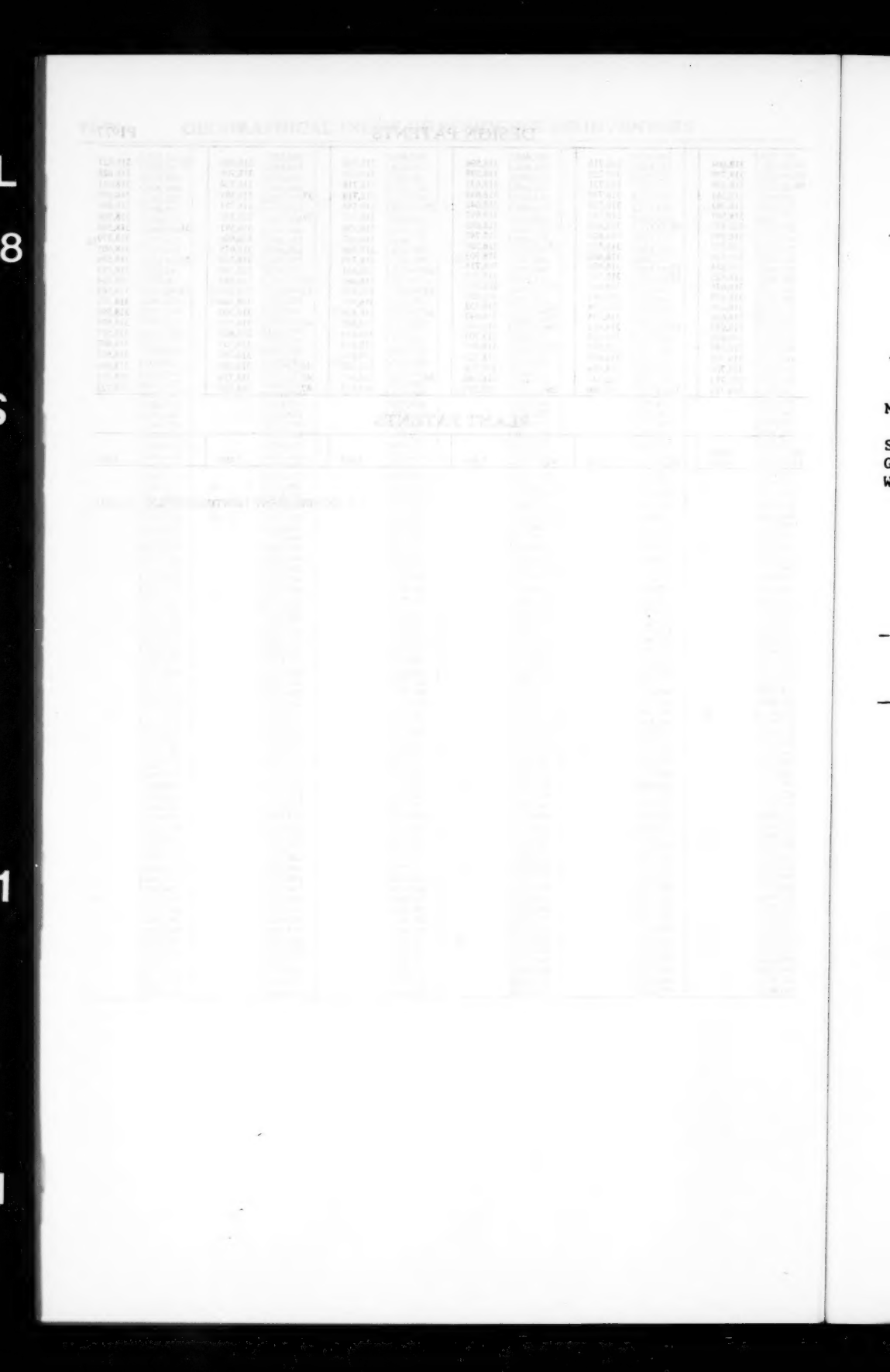

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